



1st Semester

MISS : WESAM JAD

Science Workbook
Year 5
2024–2025

Name:



D.M.RAZK

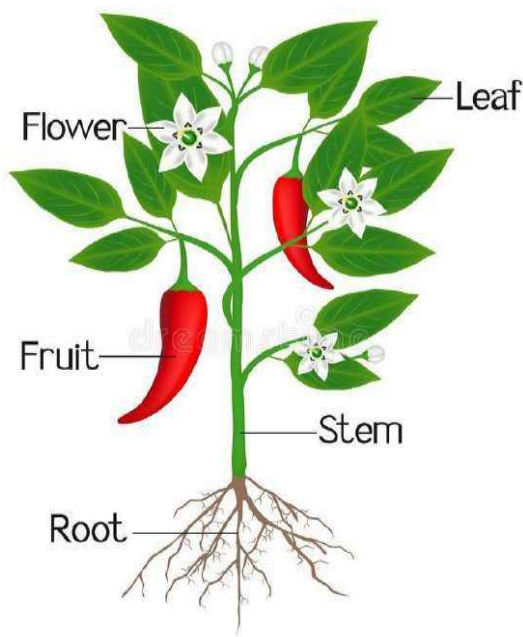
موقع الدكتور محمد رزق معلم الكيمياء التعليمي

Concept 1: Plants needs

Lesson 1

Structure of the plant:

The plant consists of: (root – stem – leaves – sometimes flowers and fruits)



- Plant roots absorb **water** and **nutrients** from the soil.
- The other parts of the plant help it to survive.

What does the plant need to grow and survive?

Plants need natural resources to grow and survive, such as:

Sunlight	Soil	Water and air	Suitable area
			That helps the plant to grow

How the plants get food?

- They make their own food through the **photosynthesis process**.

What does the animal need to grow and survive?

The animals need (food – water – oxygen gas and shelter).

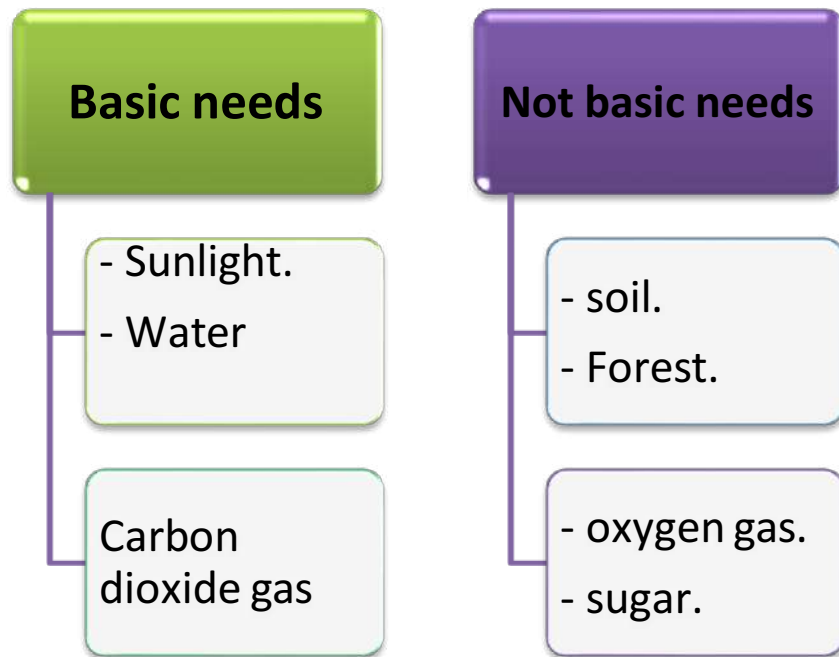
How the animals get food?

Most animals move to search food.

Notes:

- Both animals and plants need air and water.
- Plants don't need food because they can make their own food.

To grow a healthy plant, we need



- Soil was not listed as a basic plant need because some plants don't need soil to grow, such as:

<i>Plants grow in water</i>	<i>Plants grow on air</i>	<i>Plants grow on other plants</i>
		

Plants and food

Plants get food through:

<i>Plant leaves</i>	<i>Plant roots and stem</i>
- Plants make their food through the photosynthesis process. - Plant food is a kind of sugar provides it with energy needed for growth.	Plant roots absorb water and nutrients from the soil by the roots to pass to leaves through the stem.

Classwork exercises

Q(1): Choose the correct answer:

- 1- All the following structures exist in green plants, except.....
a. stems b. fruits c. blood d. leaves
- 2- Both plants and humans need.....to survive.
a. shelter b. soil
c. carbon dioxide gas d. air
- 3- Green plants can absorb nutrients from the.....
a. water b. soil c. air d. food
- 4- In the absence of.....plants will die.
a. oxygen gas b. sugar c. soil d. sunlight
- 5- If you are walking in the garden, you can observe all the parts of the plant except.....
a. stems b. fruits c. root d. leaves
- 6- Green plants can make their own food through the.....process.
a. respiration b. digestion
c. thinking d. photosynthesis

Q (2): Put (✓) or (x):

- 1- All living organisms need water and air to survive.()
- 2- The plant's root helps the plant to get its food from the soil.
()
- 3- All different structures of plant help them survive. ()
- 4- Oxygen gas is from the natural resources that plants need to make their food. ()
- 5- The digestive system help humans to get useful nutrients from the food. ()

6- The green plant is the only living organism that can manufacture its own food. ()

Q(3): Write the scientific term:

- 1- A part of the plant that absorbs water and nutrients from the soil. (.....)
- 2- A vital process that takes place in green plants to make them survive. (... ..)

Q(4): Complete:

- 1- The green plants consists of..... , ,and sometimes.....or.....
- 2- Plants root can absorb.....and..... from , while the.....of the plant is responsible for making food for the plant.
- 3- ,and.....are from the natural resources that the green plants need.

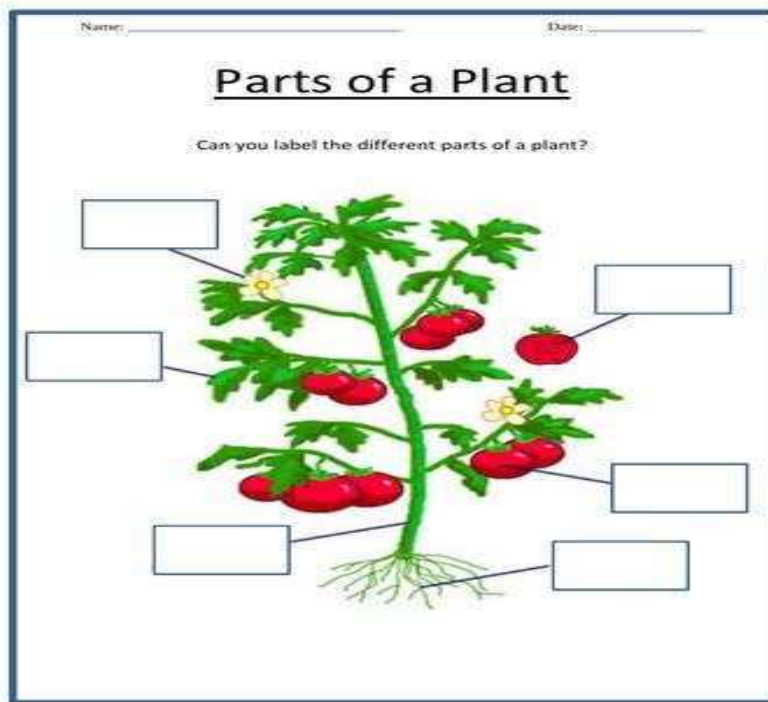
Q(5): Cross out the odd word:

- 1- Green plant – Shelter - Water – Sunlight. (.....)
- 2- Animal – Water – Food – Carbon dioxide gas. (.....)

Q(6): Give reasons for:

- 1- Plant's roots have great functions.
.....
.....
- 2- Unlike humans and animals, plants can get their food by themselves.
.....
.....

Q(7): label the following diagram:



Q(8): What happens if:

A plant is not exposed to sunlight for a few days.

.....

Homework exercises

Q(1): Choose the correct answer:

- 1- Manufacturing of the plant food takes place inside theof the plant.
a. leaves b. roots c. stem d. a, b and c
- 2- Green plants and animals are similar in.....
a. size b. structure c. growing d. moving
- 3-and.....are from the basic needs of all living organisms.
a. Soil and air b. Water and soil
c. Air and water d. Sunlight and shelter

Miss: Wesam Jad

8

- 4- Animals need all the following things to grow and survive, except..... .
a. water b. soil c. shelter d. food
- 5- Green plants can survive and grow in.....
a. air b. water c. soil d. a,b and c
- 6- The.....of the plants help in the transmission of nutrients and water to the plant leaves.
a. stem b. root c. flower d. fruit

Q(2): Put (✓) or (x):

- 1- Shelter and water are necessary for plants to grow.()
- 2- Without the soil, plants can't grow even if they get water and sunlight. ()
- 3- Plants can absorb their food from the soil by the root. ()
- 4- There are some plants that can grow easily on other plants. ()
- 5- The liquid produced from the tree sap is considered an evidence that plants need sugar. ()
- 6- The photosynthesis process is a vital process that all living organisms do to grow. ()

Q(3): Write the scientific term:

- 1- The only living organism that can make its own food.
(.....)
- 2- A part of the plant that is responsible for manufacturing the food of the plants.
(.....)

Q(4): Complete:

- 1-,and.....are from the natural resources that the green plants need.
- 2- Plants need.....gas and they producegas through the photosynthesis process.
- 3- The plant's root can grow in....., or.....

Q(5): Cross out the odd word:

- 1- Photosynthesis – oxygen gas – carbon dioxide gas – leaves. (.....)
- 2- Nutrients – digestion – photosynthesis – human. (.....)

Q(6): Give reasons for:

- 1- Soil isn't listed as a basic plant need, while the sunlight is listed as a basic plant need.

.....
.....

Concept 1.1: Lessons 2 and 3

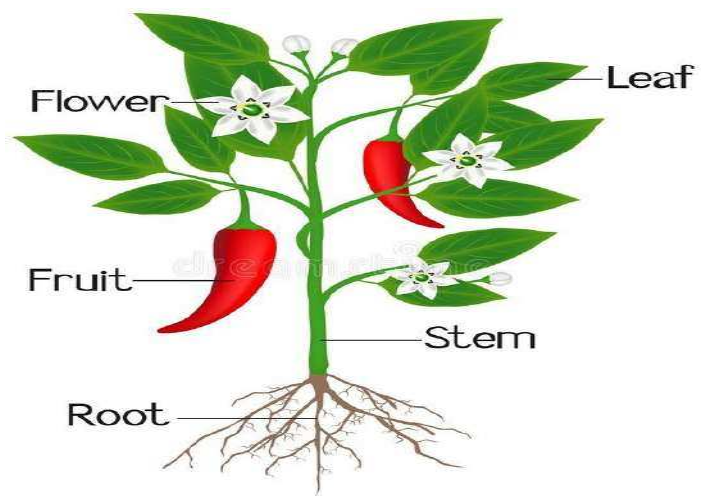
1-Soil:

- Plants can grow without soil for a while if they have water and sunlight, but after they will need either soil or an alternative that provides a source of minerals and other essential elements.

2-Sunlight:

- Sunlight is one of the basic needs of plants to grow and survive, as the plants which grow in sunlight are:
 - a- taller than that are grow in dark.
 - b- have more number of leaves.
 - c. the color of the leaves are green.

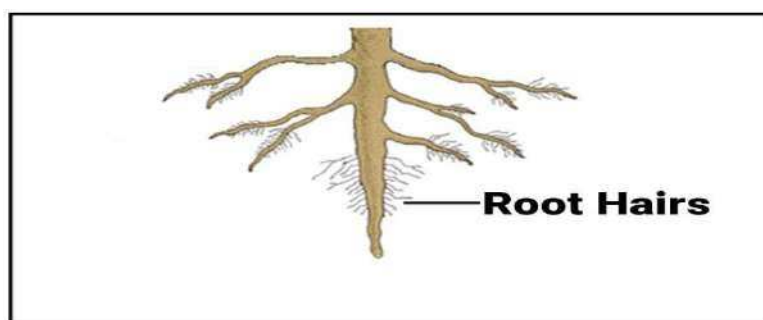
Plant structure



1- ROOT	2- STEM	3-LEAVES
It absorbs water and nutrients from the soil.	Water and nutrients move up the plant's stem through tubes called <i>vessels or xylem</i> .	- They collect sunlight. - The air that the plant needs enters the

	- xylem (vessels): they are similar vessels that connect the stem to the leaves.	leaves through the stomata. Stomata: they are tiny openings that the needed air can move to the plant through the leaves.
--	--	---

1- Plant's root:



Function of roots:

- 1- Fix the plant in the soil.
- 2- Absorb water and nutrients from the soil.

Plant roots have hair-like features called "**root hairs**".

Functions of root hairs:

- 1- Increase the amount of absorbed water and nutrients.
- 2- Allow nutrients to pass from the soil to the root.

2-Plants stem:

Functions:

- 1- They transport nutrients to the rest of the plant through the vessels.
- 2- Stem gives the plant support.

Types of stems:

- 1- **Wood stem** >>>> tree trunks and shrubs.



- 2- **Upright stem** >>>> most flowers.



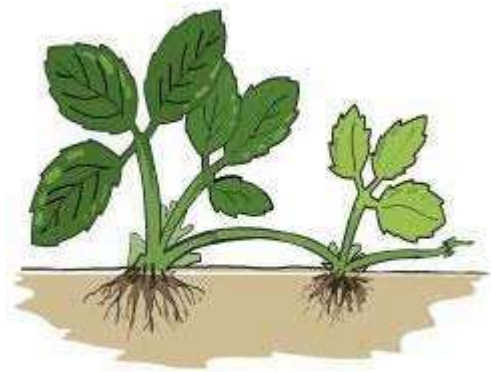
3- **Climb stem** >>>> vines



4- **Tubers** >>>> extend underground such as " potato plant"



5- **Runners** >>>> run along the ground and help to form new plants.



3-Plant leaves:

Function:

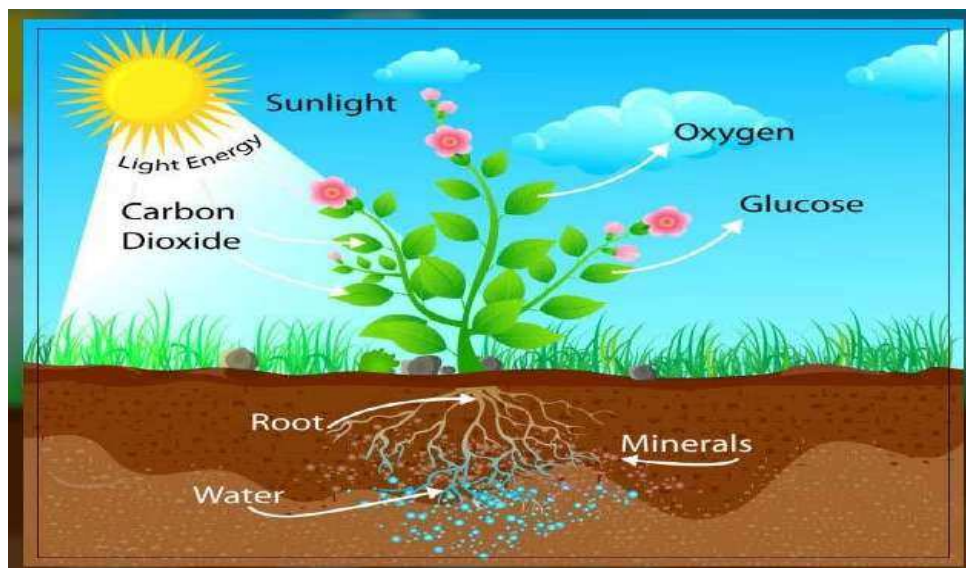
- 1- All leaves have tubes running through them called " *xylem* ".
 - *xylem* helps in carrying water from the root to the stem and leaves.
- 2- Making food through the *photosynthesis* process, as the plants take water, sunlight and carbon dioxide gas.

Types of leaves:

1- Some are narrow and look like needles (as pine)	2- Other leaves are flat and much wider.
	

photosynthesis process:

it is the process of making food inside the plant leaves by using **water**, **sunlight** and **carbon dioxide gas**.



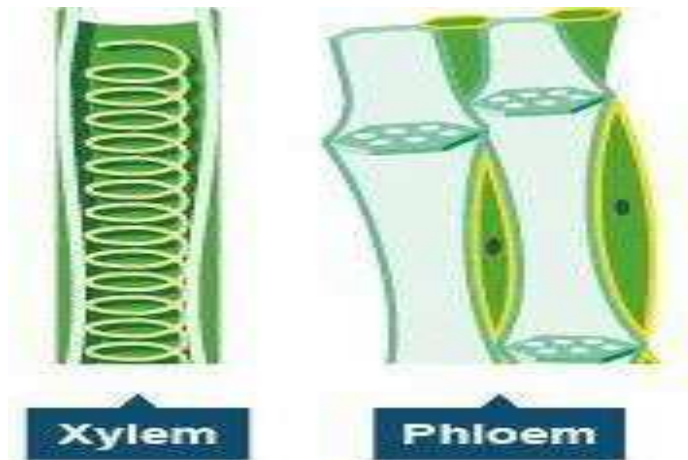
Sunlight + water + carbon dioxide gas _ glucose + oxygen gas and water vapour.

How does the photosynthesis process occur ?

- Leaves contain **chlorophyll**, which gives them their green color.
- **Chlorophyll** capture the energy from the sunlight.
- Green leaves use the light energy from the sunlight to combine the carbon dioxide gas from the air with water to manufacture nutrients (such as sugar, starch, fats and proteins) that the plant needs.

Phloem:

A set of tubes that transport the food materials downward, from the leaves to the other parts of the plant.



Xylem:

Helps in carrying water and nutrients up from the soil to the plant's leaf.

Classwork exercises

Q(1): Choose the correct answer:

- 1- The plant placed in a dark room for a week will have.....
 - a. green leaves
 - b. long stem
 - c. strong roots
 - d. few leaves
- 2- Without.....the green plants will die quickly.
 - a. oxygen gas
 - b. soil
 - c. sunlight
 - d. sugar
- 3- Carbon dioxide gas enters the plant leaf through the.....
 - a. chlorophyll
 - b. stomata
 - c. xylem
 - d. phloem
- 4- The.....in a plant are responsible for fixing the plant in the soil.
 - a. leaves
 - b. stems
 - c. roots
 - d. flowers
- 5- The.....in a plant support the plant and are responsible for the transmission of nutrients inside the plant.
 - a. leaves
 - b. stems
 - c. roots
 - d. flowers
- 6- The.....is/are small vessels that carry water and nutrients upward.
 - a. chlorophyll
 - b. stomata
 - c. xylem
 - d. phloem
- 7- Root hairs allow nutrients to transfer from the... .. to the.....
 - a. soil-stem
 - b. stem-leaf
 - c. roots-soil
 - d. soil-roots

Q2: Put (✓) or (/):

- 1- The plant grows in the soil faster than the paper towel. ()
- 2- The plant that is left in the dark has green leaves. ()

- 3- Sunlight is very necessary for a plant to survive and grow. ()
- 4- Plants and animals are similar in the way of getting their food. ()
- 5- All non-living things have basic needs to survive. ()
- 6- Xylems are smaller tubes that connect the stem to the leaf. ()
- 7- Stomata are responsible for the absorption of sunlight. ()
- 8- Chlorophyll is responsible for the green color of the plant. ()
- 9- Root hairs allow nutrients to move directly from the soil to the stem. ()

Q(3): Write the scientific term:

- 1- A structure inside the plant's leaves that is responsible for its green color. (.....)
- 2- A structure inside the plant's leaves that is responsible for allowing air to enter it.
(.....)

Q(4): complete:

- 1- The growth of seeds planted on paper towels isthan those planted in the soil.
- 2- The height of a plant that is placed in the light is.....that placed in a dark room.
- 3- ,.....and.....are essential elements to perform photosynthesis process.
- 4- In the absence of.....the leaf of the plant will lose its green color.
- 5-can make their own food inside them, while.....and.....can't.

- 6- Plant's roots absorb.....and.....
from the soil.
- 7-are smaller tubes that carry nutrients
upward the plant, while.....carries food
from the.....to other plant parts.

Q(5): Cross the odd word:

- 1- Plant's leaf – root hair – chlorophyll – stomata.
- 2- Green plants – water – sunlight – carbon
dioxide gas – oxygen gas.

Q(6): Give reasons for:

- 1- Green plants grow better in the soil than on paper
towels.
.....
.....
- 2- Plants and human are different in the way of getting
their food.
.....
.....

Q(7): What happens if:

You have a plant in a dark room for 5 days.

.....

Q(1): Choose the correct answer:

- ## Q2: Put (✓) or (/):

- 21

- 5- Oxygen gas is released from photosynthesis process as a waste material for the plant. ()
- 6- Photosynthesis process takes place inside the plant's leaves. ()
- 7- Phloem transfers glucose from the leaf to other plant parts. ()
- 8- Without the sun, all living organisms will die. ()

Q(3): Write the scientific term:

- 1- A structure inside the plant that carries nutrients upward. (.....)
- 2- A structure inside the plant that carries food to all plant cells. (... ..)

Q(4): complete:

- 1- The stomata exists in.....and they absorbfrom the air during photosynthesis process.
- 2- Root hairs allow water and nutrients to pass from theto the.....
- 3- Shrubs have.....stems, while... ..have tuber stems.
- 4- The spines have.....leaves that look like.....
- 5- The absorption of sunlight inside plant's leaf is the function of.....
- 6- Green plants use the.....energy obtained from the sun to combine withand.....to produce.....and release.....in the air.

Concept 1.1 lessons 4 and 5

Activity 11: How do humans and plants obtain the energy and gases needed for survival and growth ?

1-Getting energy

Plants	Humans
They can get energy and making glucose from photosynthesis. Process.	-They can get the energy from eating food. -Glucose and other nutrients enter our body through the digestive system. -nutrients are absorbed into the blood through chewing.

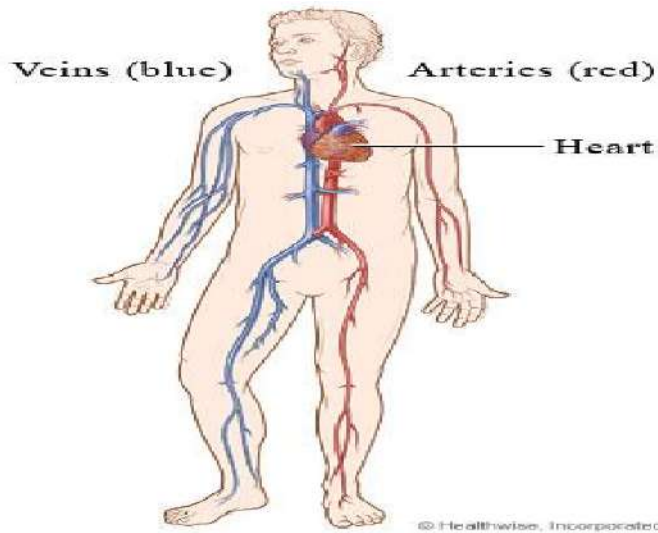
3-Getting gases

Both plants and humans must take in gases from the air.

Plants	Humans
Gases enter plants through the leaves.	Air enters the human body through our nose and mouth and travels to the lungs, where oxygen is absorbed into circulating system.

Comparing plant and human systems

1- Human circulatory system:



Structure:

It consists of the heart and blood vessels (veins and arteries).

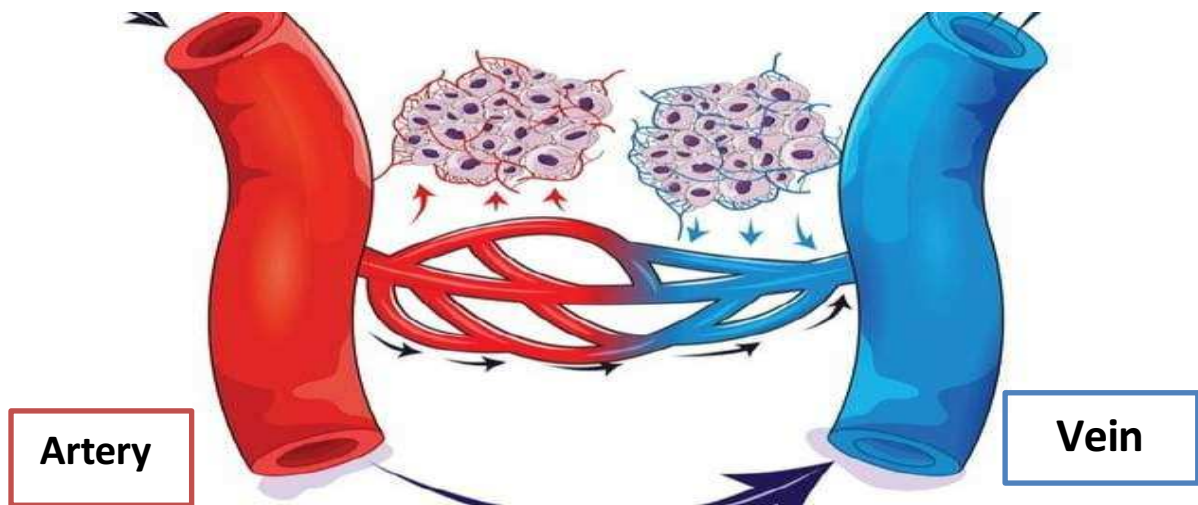
Blood vessels:

They are tubes that transport nutrients and oxygen to the cells and organs.

Notes:

- 1- Blood moves in only one direction in a human's veins or arteries.
- 2- You can see your arteries and veins through your skin on your hands or arms.

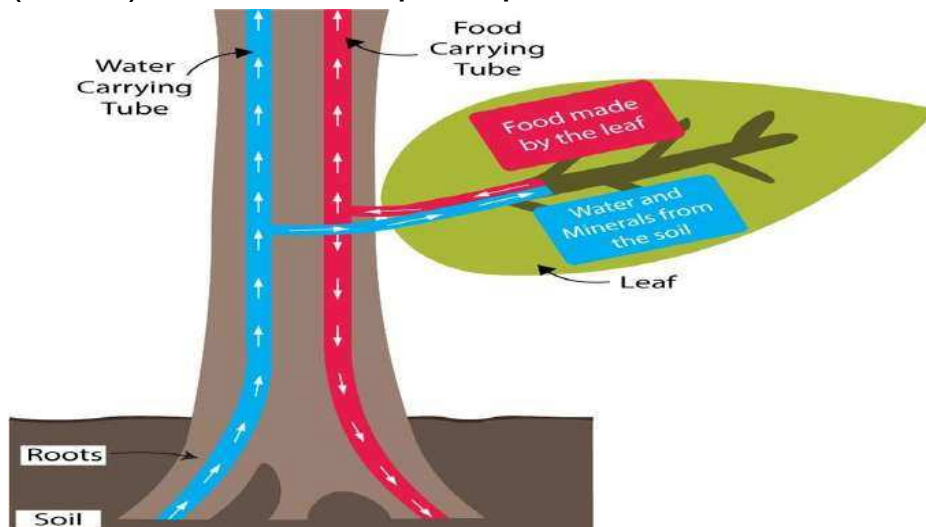
The difference between arteries and veins:



Arteries	Veins
They carry the blood with oxygen and glucose away from the heart to organs, muscles, bones and cells so the body can grow and heal.	They return the blood that carries carbon dioxide and is low in nutrients and oxygen back to the heart to recharge it.

2- Plant transport system:

- It is like the circulatory system , as it transports **water rich in nutrients** in **one direction** within the vessels (tubes) between the plant parts.



Miss: Wesam Jad

25

Transfer of water and nutrients within the plant

1- Roots:

they absorb water and nutrients from the soil to send them to the leaves.

2- Xylem (wood):

Transport nutrients rich in water up to the plant's leaves.

3- Leaves:

They start manufacturing glucose when water reach them.

4- Phloem:

Once energy production is complete, the phloem carries glucose downward to all the plant parts.

Note:

- **Chlorophyll** in plant leaves captures the light energy from the sun.

Energy transformation in photosynthesis process

Light energy that is absorbed from the sunlight is transformed into **chemical energy** that is found in glucose.

Notes:

- 1- Photosynthesis process takes place in plant's leaves.
- 2- Energy can be transformed from one form to another.
- 3- Oxygen gas is a waste material for plants.

Flowers



- Flowers of plants have different **shapes**, **sizes** and **colors**.
- Some plants such as **grasses** have very small flowers that are hardly noticeable.
- Some flowers are **not very colorful**.

Flower function (job):

It helps the plant to reproduce.

Plant reproduction:

It is the process of making new plants.

Flowers:

They are the reproductive parts of many plants.

Sunflowers:



They are small dark colored objects in the center of the flower are seeds.

If these seeds receive air, water and the correct temperature, they can grow into a new plant.

Some seeds of different plants

Seed	Figure	The way of seed dispersal
Coconut seed		Water, because it is hollow from the inside, and floats on the surface
Tomato seed		Wind, because it has wing-like structure that help it move with the help of the wind.

Maple seed and apple seeds		Organisms that eat the fruit and spread the seeds.
Burdock seed		It has spines that help it stick to living organisms, like animal fur and human clothing to spread from one place to another.
Dandelion seed		Wind, because of its parachute – like structure, which enables it to spread in the presence of wind.

Classwork exercises

Q(1): Choose the correct answer:

- 1- Plants can get their energy and make their own food through.....process.
 - a. digestion
 - b. thinking
 - c. respiration
 - d. photosynthesis
- 2- The.....system helps humans and animals to get their needed energy from food.
 - a. nervous
 - b. circulatory
 - c. digestive
 - d. skeletal
- 3- Air goes in and out the leaf through the..... .
 - a. xylem
 - b. phloem
 - c. chlorophyll
 - d. stomata
- 4- Oxygen gas is extracted from air inside the.....of a human.
 - a. nose
 - b. mouth
 - c. nose and mouth
 - d. lungs
- 5- The human circulatory system includes all the following except.....
 - a. heart
 - b. vein
 - c. artery
 - d. lungs
- 6- Blood vessels carry all the following components, except.....
 - a. water
 - b. carbon dioxide
 - c. oxygen
 - d. nutrients
- 7-carry the blood rich in oxygen from the heart to all body cells.
 - a. Xylem
 - b. Arteries
 - c. Veins
 - d. Nerves

Q2: Put (✓) or (/):

- 1- Air enters the leaf of the plant through the stomata. ()
- 2- Both humans and plants need energy to grow and survive. ()
- 3- Air enters the human body through the lungs. ()
- 4- You can't see the veins and arteries inside your body. ()

- ()
- 5- Blood moves in the human body in one direction. ()
- 6- Arteries carry the blood rich in oxygen from the heart to all body cells. ()

Q3: write the scientific term:

- 1- It exists inside the leaf and is responsible for absorbing the sunlight from the sun. (.....)
- 2- It carries glucose from the plant's leaf to all the plant parts. (... ..)
- 3- A part of the plant that is responsible for the reproduction process. (.....)
- 4- It is the process of making a new plant. (.....)
- 5- It is the process of transporting seeds from a place to another. (.....)

Q4: Complete:

- 1-transport water rich in nutrients from the top of the plant to the leaves.
- 2-starts to manufacture glucose when water rich it.
- 3- The.....carries the glucose to other parts of the plant.
- 4- As plant cells use glucose, they release..... and.....in the air.
- 5- Energy can be.....from one form to another.
- 6- Flowers of plants have different.....or... .., while they have the same.....
- 7- Some plants such as.....have very small flowers that are hardly noticeable.

Q5: What happens if:

1- Sun disappears suddenly.

.....

2- Xylem is removed from the plant structure.

.....

Q6: Give reasons for:

1- Plants and humans get the needed energy in different ways.

.....

.....

2- Arteries and veins play a very important role in the human body.

.....

.....

Homework exercises

Q(1): Choose the correct answer:

1- Both.....and.....are similar in carrying nutrients.

a. arteries – phloem

b. veins – xylem

c. arteries – xylem

d. veins – phloem

2-transport water rich in nutrients upward the plant.

a. Stomata

b. Veins

c. arteries

d. xylems

3- The.....is/are responsible for the transmission of food from the leaves to all plant parts.

a. xylem

b. phloem

c. chlorophyll

d. stomata

4- The human circulatory system and the plant transport system are similar in.....

a. structure

b. function

c. shape

d. color

- 5- The.....has a very small flower that can hardly be seen.
a. sunflower b. grass c. rose d. vine
- 6- Most of flowers are similar in.....
a. size b. color c. job d. shape

Q2: Put (✓) or (/):

- 1- Veins carry the blood rich in carbon dioxide gas to all body cells. ()
- 2- Nutrients in the xylem move upward in one direction. ()
- 3- Glucose is produced in plants by digestion process. ()
- 4- In photosynthesis process, light energy is changed to chemical energy. ()
- 5- Carbon dioxide gas is a wasted material for all living organisms. ()
- 6- Energy can't be transformed from one form to another. ()

Q3: write the scientific term:

- 1- They carry blood rich in oxygen and glucose away from the heart to the body organs. (... ..)
- 2- They return the blood that carries carbon dioxide to the heart for a recharge. (... ..)
- 3- A system inside the human body that helps in getting the energy needed from the blood. (... ..)
- 4- A system inside the human body that includes the heart and the blood vessels. (... ..)
- 5- It exists inside the leaf and is responsible for absorbing the sunlight from the sun. (... ..)

Q4: Complete:

- 1- Plants can manufacture their own energy and glucose through the..... process.
- 2- Air enters the human body through the..... andand travels to the....., where the oxygen is absorbed through the circulating blood.
- 3- As we chew and swallow our food, nutrients are absorbed into the.....
- 4- They are two different types of blood vessels calledand.....
- 5- Blood moves in only.....direction in human veins or arteries.
- 6-carry blood rich in oxygen and glucose away from the heart.

Q5: What happens if:

- 1- Human body contains arteries only without veins.
.....
.....

Q6: Give reasons for:

Although flowers are different in their color and size, but they perform the same job.

.....
.....

Concept 1.2: Energy flow in ecosystems

Miss: Wesam Jad

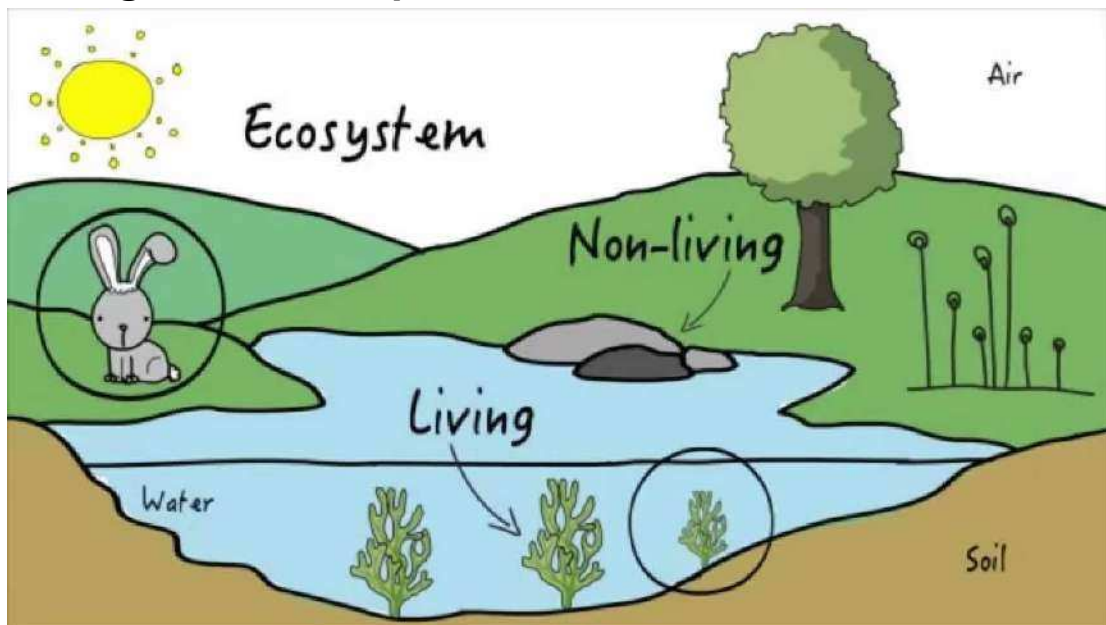
34

Lesson 1: Ecosystem

Ecosystem:

It is an area or community that contains living organisms and nonliving things that interact with each other.

- The interaction between different components of an ecosystem depends on the flow of energy through these components.



How does energy flow through an ecosystem?

- Energy moves through an ecosystem from plants to animals and between animals when they eat each other, then when living organisms die, their energy is returned to the soil.

Hawks in an ecosystem

- Hawks can get energy from food as they eat different types of animals such as, **Snakes, Mice, Fish, Birds, Squirrel, Rabbits** and other small ground animals.



What do you already know about energy flow in ecosystem ?

- There are many different ecosystems on the Earth such as " **Ocean, Rainforest, Desert or the Tundra** "
- Animals don't choose the food they eat according to its taste, but they eat according to what their body needs.

Examples:

- Caracal eats **mouse**.
- Rabbit eats **grass**.
- Birds eats **butterflies and worms**.

The primary source of energy



The sun.

- Living organisms also can get their energy from eating food.

How plants and animals can get their energy?

Plants	animals
They can get their energy from photosynthesis process by absorbing sunlight and converting it to " sugar and glucose ".	- They cannot make their food, so they can get the energy from. - Eating plants only as " Rabbit". - Eating other animals that eat plants as " giraffe". - Eating both plants and animals as "

Concept 1.2: Energy flow in ecosystems

Lesson 2: Food Chains

Energy for life:

- All living organisms eat food to get the energy they need to survive, as they feed on one another, so energy passes between them.

Living organisms can be classified into 3 groups according to the way of feeding, which are:

- 1- Producers. 2- Consumers. 3- Decomposers.

1- **Producers:**

They are organisms that can make their own food and don't consume other plants or animals.

Ex: plants

As they can make their own food from the photosynthesis process.

2- **Consumers:**

- 3- They are organisms that eat other living organisms to get their energy, because they cannot make their own food.

There are 3 types of consumers:

Primary consumers	Secondary consumers	Tertiary consumers
- They are animals that eat plants. - Many insects are primary consumers	- They are the animals that eat the primary consumers. - Birds are secondary consumers because they eat insects.	- They eat the secondary consumers. - They are often large meat-eating animals like crocodile.



4- Decomposers:

They are organisms that carry out the process of decomposition by breaking down or decaying dead organisms.

Examples:

Fungi, bacteria, worms and **millipedes**.



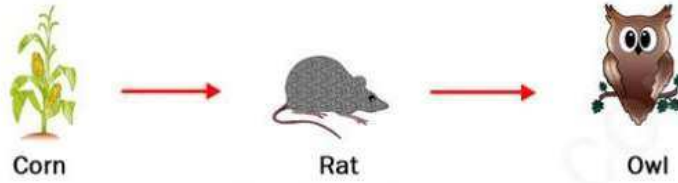
Note:

Worms and millipedes produce waste rich in nutrients that increase the **soil fertility** for plant growth.

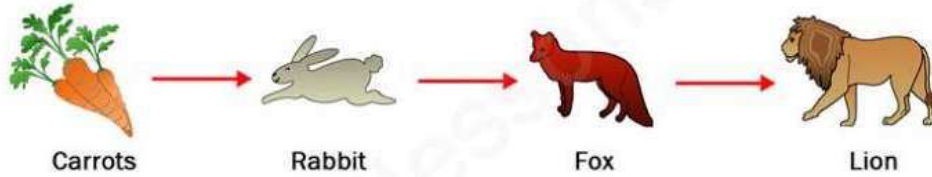
Food chain:

It is a model that shows one linear set of feeding relationships and movement of energy between living organisms.

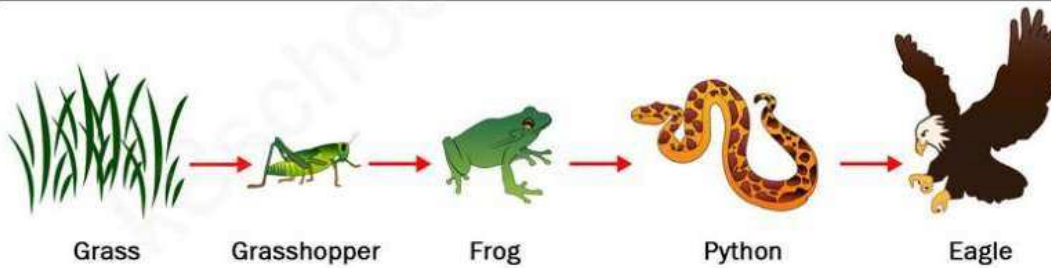
Food Chains



A three linked food chain



A four linked food chain



A five linked food chain

From the previous explanation we can conclude that the flow of energy starts from **the sun to the producer, then to the consumer and finally to the decomposers.**

Predatory and prey

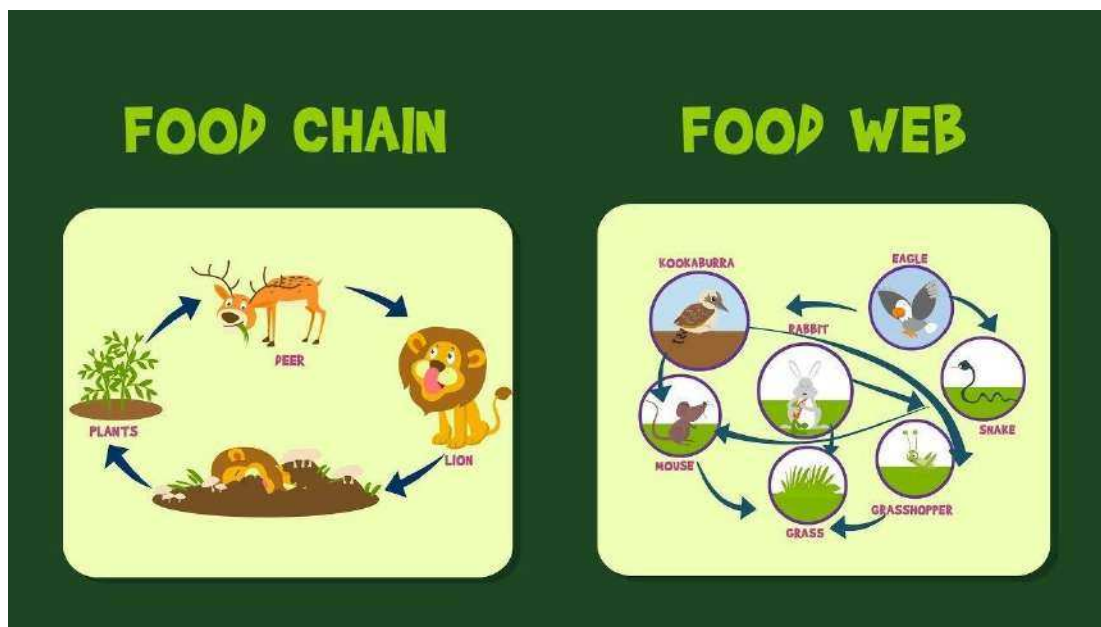
From the previous food chains we can conclude that:

- The fox and lion are "**predators**", because they hunt other animals.
- The rabbit is a "**prey**", because it is hunted by other animals.
- Any consumer is a **predator**.
- Any hunted animal is a **prey**.

Lesson 3: Food web

Food web " interconnected food chains":

It is a model that shows many different feeding relationships among living organisms and it consists of more than one food chain.



Classwork questions on lessons 1,2 and 3

Q1: Choose the correct answer:

- 1- A community that includes living organisms and nonliving things is known as.....
a. ecosystem b. respiratory system
c. digestive system d. nervous system
- 2- Hawks get their energy from.....
a. plants only b. animals only
c. plant and animals d. nonliving things
- 3- Caracal obtains its energy by eating.....
a. shark b. grass c. mice d. butterfly
- 4- According to the way of feeding, living organisms are classified into..... groups.
a. two b. three c. four d. five
- 5- Many insects are considered as.....
a. producers b. decomposers
c. primary consumers d. secondary consumers
- 6- All the following organisms are consumers, except....
a. deer b. crocodile c. rabbit d. millipedes.
- 7- Decomposers always.....the soil.
a. pollute b. damage c. benefit d. harm
- 8- Secondary consumers can eat only.....
a. decomposers b. producers
c. primary consumers d. tertiary consumers
- 9- A hawk can eat....., when snakes are completely disappear from an ecosystem.
a. grasses b. grasshopper c. birds d. leaves

Q2: Put (✓) or (x):

- 1- There is no interaction between the components of an ecosystem. ()

- 2- The light energy allows carbon dioxide gas to combine with water inside the leaves to make glucose. ()
- 3- After death living organisms, all energies that present in their bodies go to the soil. ()
- 4- Butterfly can make its own food from sunlight. ()
- 5- Producers don't need consumers to survive. ()
- 6- The first link in any food chain is a consumer. ()
- 7- The predator is a consumer that eats another animal. ()
- 8- In a food chain, the energy can pass from a predator to a nonliving thing then to a primary consumer. ()
- 9- Food web is the interconnected food chains that shows many different feeding relationships. ()

Q3: write the scientific term:

- 1- It is a form of energy that changes into chemical energy during the photosynthesis process. (.....)
- 2- Living organisms that both humans and animals need to survive. (... ..)
- 3- A group of living organisms that can live on decaying organisms. (... ..)
- 4- The animal that is eaten by another animal. (.....)
- 5- It is a model that shows one linear set of feeding relationships and energy flow between living organisms. (... ..)

Q4: Complete:

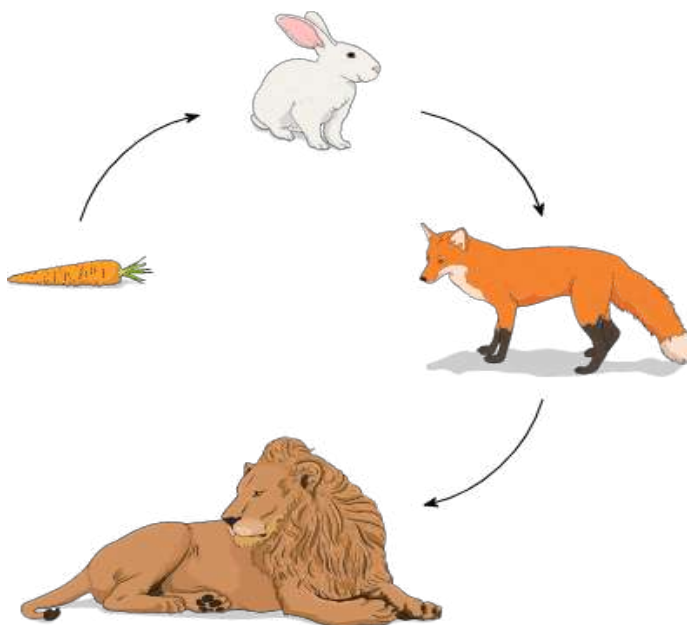
- 1- The most common producers are.....

- 2- Decomposers and.....depend on producers to get their energy.
- 3- If a frog eats an insect that feeds on plants, this means that the frog is a.....
- 4- Plants produce.....and during photosynthesis process.
- 5- Hawks attach rabbits to get their energy, while rabbits feed on.....to get their energy.

Q5: Give reasons for:

- 1- Humans need to eat some animals and plants.
.....
- 2- Soil fertility depends on decomposers.
.....
.....

Q6: Complete the following food chain:



Homework questions on lessons 1,2 and 3

Q1: Choose the correct answer:

- 1- All the following are types of primary consumers, except.....
a. grasses b. seeds c. fruits d. eagles
- 2-are living organisms that can make their food directly from the light energy of the sun.
a. worms b. grasses c. trees d. grasses and trees
- 3- Waste materials produced from millipedes and worms are rich in.....
a. water b. nutrients c. oxygen d. carbon dioxide
- 4- We need more energy during.....
a. watching TV b. physical exercises
c. sleeping d. listening to music
- 5- The.....energy comes from the sun is important for the photosynthesis process.
a. sound b. light c. kinetic d. potential

Q2: Put (✓) or (x):

- 1- We can live without moonlight, but we cannot live without sunlight. ()
- 2- There are activities that don't need energy like listening to music. ()
- 3- The 1st link in any food chain is the consumer. ()
- 4- Some consumers can live in hot sunny weather, but they cannot live in a completely dark room. ()
- 5- Hawks, crocodiles and sharks are consumers. ()

Q3: write the scientific term:

- 1- The consumer that hunts and eats another animal.

Miss: Wesam Jad

- (.....)
- 2- A group of living organisms that can produce their own food. (.....)
- 3- The gas that is present in air and necessary for the formation of plant food. (.....)

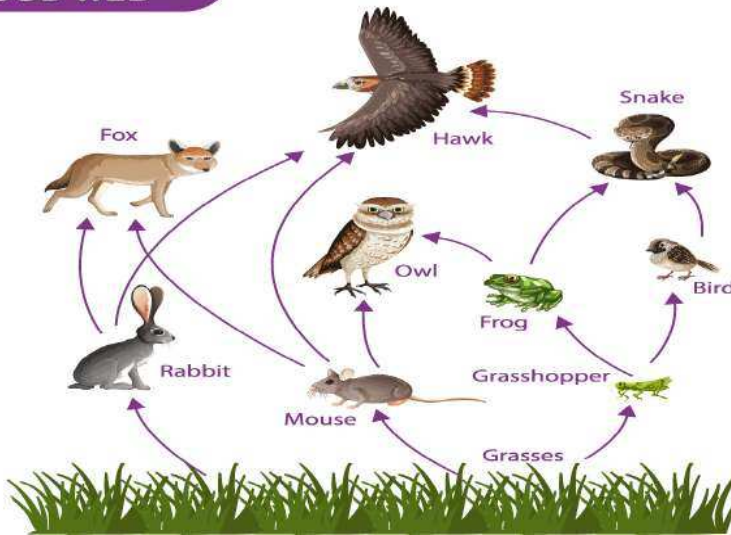
Q4: Complete:

- 1- An area that provides food, water and shelter to all living organisms which live in it, is known as.....
- 2- Plants produce.....andduring the photosynthesis process.
- 3- The most common producers are.....
- 4- Living organisms include.....,and decomposers.

Lesson 4

FOOD WEB

BYJU'S
The Learning App



- It is better to use food web to show interactions among living organisms than the food chain. **G.R**
Because a food web shows interactions among many food chains so, the food web contains many organisms, while a food chain shows interactions between just few organisms.

What are decomposers ????

- Decomposers make one of the most important processes on Earth which is called "**decomposition process**".

Examples:

Worms, millipedes and bacteria	Mushroom fungus
--------------------------------	-----------------



Waste and dead organisms

Waste	Dead organisms
- When you are finished using something like a food wrapper or a piece of paper you might throw it into a trash can. - Humans produce a lot of waste, so landfills take up more and more space How can human reduce this waste??? - By " Recycling" as people use waste materials and make new products instead of going into a land fill.	When organisms die, decomposers decompose their bodies to release the nutrients back to the environment. 

Restoration ecology

- It is important for plants and animals that help them have a stable environment to survive.

Seed dispersal

Different plants need different ways to transport (disperse) their seeds:

Plants with sticky seeds	Plants have light seeds
Humans and animals transport those seeds to another place to be planted.	They are dispersed by wind to different places to be planted.

Classwork questions

Q(1): choose the correct answer:

- 1- To make a food web, you have to classify animals in an ecosystem according to their.....they get.
a. water b. light c. gases d. food
- 2- The predator in a food web usually eats more than one type of.....
a. producers b. consumers
c. decomposers d. plants
- 3- Rabbits eat all the following types of food, except.....
a. grasses b. carrots c. seeds d. insects
- 4- All the following living organisms are decomposers, except.....
a. fungus b. bacteria c. slugs d. hyenas
- 5- Plants with sticky seeds need.....to stick to disperse their seeds and grow in a new habitat.
a. air b. water c. light d. body of living things

Q2: Put (✓) or (/):

- 1- The number of secondary consumers will increase if the number of primary consumers decreases in an ecosystem. ()
- 2- The food web describes energy flow and feeding interactions between living organisms in an ecosystem ()
- 3- Both of bread mold fungus and house fly are decomposers. ()
- 4- Recycling of waste materials reduces pollution and the size of landfills. ()
- 5- Restoration ecology negatively affects human health. ()

6- All plants need the same way to disperse their seeds.
()

Q3: Write the scientific term:

- 1- They are scientists who work restoration to have a stable environment for plants to survive. (.....)
- 2- It is a process by which humans can make new products from waste materials. (.....)

Homework questions

Q(1): choose the correct answer:

- 1- A snake is a predator for mice, while a snake is considered as a prey for.....
a. rabbit b. frog c. eagle d. deer
- 2- If there is no primary consumers in an ecosystem, the producers will.....
a. increase b. decrease c. die d. not be affected
- 3- In a food chain, there is a.....found between a producer and a secondary consumer.
a. decomposer b. predator
c. primary consumer d. tertiary consumer
- 4- Wind play an important role in dispersing.....seeds.
a. small light b. big heavy c. sticky d. floating

Q2: Put (✓) or (/):

- 1- Both of small light seeds and big heavy seeds can disperse by wind. ()
- 2- At the beginning of decomposition process, decomposers break dead organisms down into smaller pieces. ()
- 3- Nutrients that present in living organisms bodies returned to the ecosystem after death. ()

Miss: Wesam Jad

4- If a food chain, the energy transfers from eagles to mice. ()

Q3: Write the scientific term:

- 1- They are organisms that break down the remains of dead plants and animals into nutrients that return to the ecosystem. (.....)
- 2- Organisms that use human clothes or animal bodies or even wind to disperse their seeds to new habitat. (.....)

Q4: Complete:

- 1- Bread mold fungus and mushroom are two types of.....
- 2- We cannot make a food web, if we don't know the.....that the animals eat.

Concept 1.3: Changes in food webs

Lessons 1 and 2

- **Ecosystems and food webs can be affected by many factors such as:**
 - 1- Climate changes.
 - 2- Human activities.
 - 3- **Pollution: it is the harms that happen to air, water or soil by substances that can harm living organisms.**

Examples:

Droughts	Polluting water
	

- **What will happen to a food web when an organism or the environment changes within an ecosystem ?**

All organisms will be affected, where:

- 1- If plants were disappeared, the consumers will need to move to other places to search for food or they will die.
- 2- If the number of species of consumers increases, the resources of food and shelter may disappear so, they will die.

Human activities affect the marine habitats through:

Overfishing	Water pollution
-------------	-----------------

Miss: Wesam Jad

53

When humans catch many fish from rivers, seas and oceans.	When humans throw wastes in the seas, rivers and oceans.
	

Protection the marine environment in Palau island



- In any island, it is impossible to separate what happens on land from what happens in the marine environment. **GR** Because the island is a land surrounded by water, and any pollution that occurs on it may affect the water and vice versa.

Palau island:

It is an island that uses various conversation programs to protect the marine environment and its resources.

How can Palau island protect its ecosystem ?

- Palau manages land activities in order to control the quality of the marine environment.
- Palau also needs well-designed protected marine environments.
- Palau works with fishers to make sure they are not overfishing in the coral. Reef regions.

What happens if any change in an ecosystem occurs ?

- 1- The food web changes.
- 2- Some living organisms die.
- 3- The ecosystem is disturbed.

If	Then	Drawing
1- There is a gentle rain in the desert.	- Gentle rains help producers to grow. - The desert ecosystem gets better.	
2- There is a heavy rain in the desert.	- Heavy rains lead to floods. - The desert ecosystem gets damaged.	

3- There is **drought**.

- All grasses will die.
- Living organisms that depend on it will die.



4- There are **many top predators** in the food web.

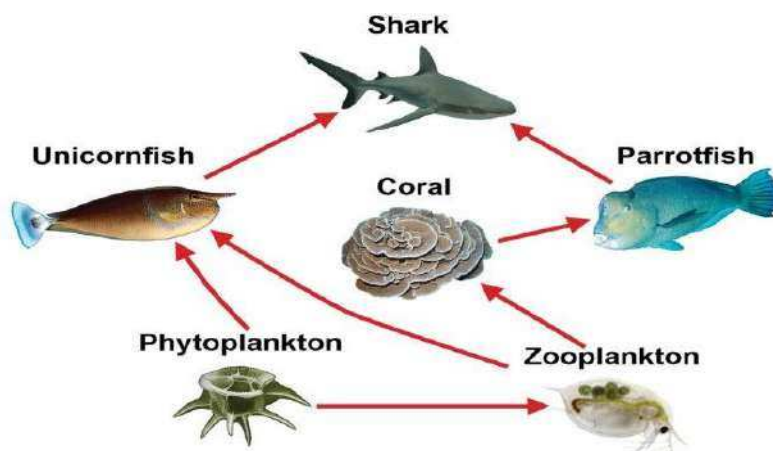
- Predators will eat all living organisms.
- The food web gets harmed.



Top predators:

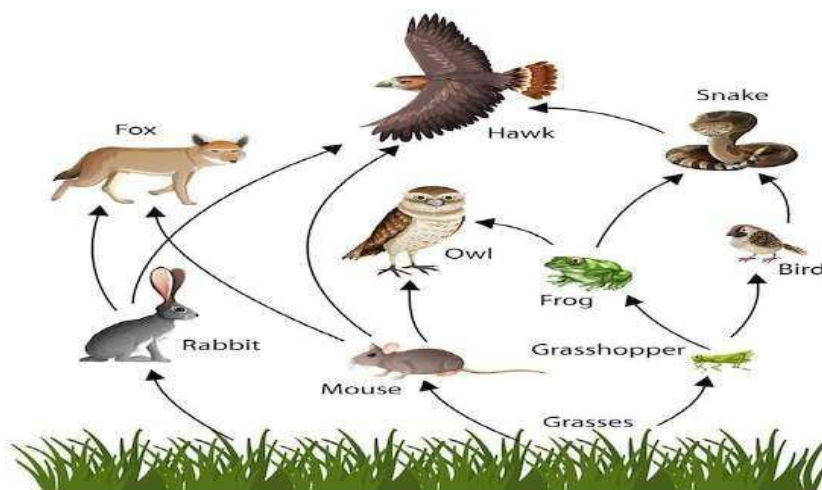
They are predators (consumers) that exist at the top of food chains such as: Tigers, sharks, crocodiles, etc. ...

Marine food webs



Coral make their own food → parrotfish feed on coral → shark feed on parrotfish.

Desert food web



What happens

- 1- When the rabbits (hares) if all the grass were removed from the desert.
 - Rabbits would not find any type of food, therefore they will die.
- 2- To the eagles if all the grass were removed from the desert.
 - At first, the eagles would not be effected but when the rabbits die, the eagles would have less food.

Note:

The energy in the overall system remains as the same, where:

- 1- **10%** only of this energy transfers between living organisms when an organism feeds on the other.
- 2- **90%** of this energy is left to the decomposers which return this energy back to the soil.

Classwork exercises on lesson 1

Q1: Choose the correct answer:

- 1- The desert is exposed to.....is considered a healthy ecosystem.
a. drought conditions b. heavy rains
c. gentle rains d. high temperature
- 2- When a predator feeds on a prey,...is transferred between them.
a. water b. blood c. motion d. energy
- 3- Human activities and pollution in.....impact the marine ecosystem quickly.
a. cities b. forests c. deserts d. island
- 4- Heavy rains in the desert might cause.....
a. growing more grasses b. migration of predators
c. death of all organisms d. drought conditions
- 5- Which of the following represents the correct marine food chain ?
a. Algae _ coral _ shark _ parrotfish
b. Algae _ shark _ coral _ parrotfish
c. Algae _ shark _ parrotfish _ coral
d. Algae _ coral _ parrotfish _ shark
- 6- In this food chain (Grass _ Giraffe _ Lion), the symbol _ represents the transferring of.....
a. pollution b. force c. energy d. motion

Q2: Put (√) or (X):

- 1- Overfishing is one of the most damaging human activities that impact the desert ecosystem. ()
- 2- Food and water resources may run out by increasing the number of one species. ()
- 3- The human land activities on island have no effect on the marine ecosystem. ()

- 4- Gentle rains make the desert ecosystem healthier. ()
- 5- Algae are considered the producers in most land ecosystem. ()
- 6- Food chains describe the way of transferring energy among non-living things. ()
- 7- Energy is transferred from a prey to predators in any ecosystem. ()

Q3: Write the scientific term:

- 1- The 1st organism that is affected by death of producers. (.....)
- 2- An example of producers in the desert ecosystem. (.....)

Q4: Complete:

- 1- The ecosystem becomes.....if decomposers are extinct.
- 2-and.....are bad human activities that impact the marine ecosystem.
- 3- If grass is removed from an ecosystem,..... consumers may die quickly, while..... consumers may migrate.
- 4- If a desert is exposed to gentle rains,will grow and.....will find food.

Q5: Give reasons for:

- 1- Palau island manages land activities.
.....
.....
- 2- Gentle rains cause a healthy ecosystem.
.....
.....

Homework exercises on lesson 1

Q1: Choose the correct answer:

- 1- If the grass is removed from an ecosystem,.....will die first.
a. primary producers b. primary consumers
c. secondary consumers d. decomposers
- 2- Increasing the number of predators cause a decrease in the number of.....
a. producers b. preys
c. decomposers d. other predators
- 3- All the following examples represent human bad activities, except.....
a. overfishing b. pollution c. floods d. cutting trees
- 4- Energy could be recycled back into the ecosystem by the.....
a. predators b. preys
c. consumers d. decomposers
- 5- The greatest damage occurs to the desert food web when.....become extinct.
a. grass b. hawks c. snakes d. mice

Q2: Put (✓) or (X):

- 1- If the grass is removed from the desert, hawks will die quickly. ()
- 2- Heavy rains in the desert cause the growth of more grass. ()
- 3- Secondary consumers provide energy to primary consumers. ()
- 4- Consumers may migrate if the producers were removed from the ecosystem. ()
- 5- Energy remains in the ecosystem as it is although it is transferred between organisms. ()

6- Secondary consumers provide energy to primary consumers. ()

Q3: Write the scientific term:

- 1- An example of producers in the marine ecosystem. (.....)
- 2- Organisms that return the energy back into the ecosystem. (.....)

Q4: Complete:

- 1- Falling of.....in the desert may cause floods.
- 2- Energy in the ecosystem remains as it is, although energy is.....between living organisms, so most of this energy is recycled back into the ecosystem by.....
- 3- In any ecosystem, prey.....predators with energy.
- 4- The relationships between organisms play an important role in keeping.....of the ecosystem.

Q5: Give reasons for:

Heavy rains cause an unhealthy ecosystem.

.....
.....

Q6: What happens when:

- 1- Gentle rains fall on the desert.
.....
- 2- Heavy rains fall on the desert.
.....

Lesson 2: Pollution

Does pollution affect the food webs ?

pollution affects the food webs when food resources and habitats of living organisms in these food webs are polluted which may lead to the death of these organisms.

Imagine that there is a fire in a forest, you will notice the following things:

- 1- Smoke and ash are separated all over the forest and cover the grasses.
- 2- Animals may have difficulty in breathing and may die.

Population changes

There are many factors that affect the ecosystem such as:

- 1- Increasing or decreasing the amount of water.
- 2- Increasing or decreasing the temperature.
- 3- Climate change.

These factors cause problems for many living organisms, where:

- 1- If the climate change is suitable, the population of a species increases, but if it is unsuitable, the population of a species decreases, so organisms would either die or move to another place.

Population:

It is the number of organisms of one type of species living in an area.

2- An increasing or decreasing in one species affects the population of other species.

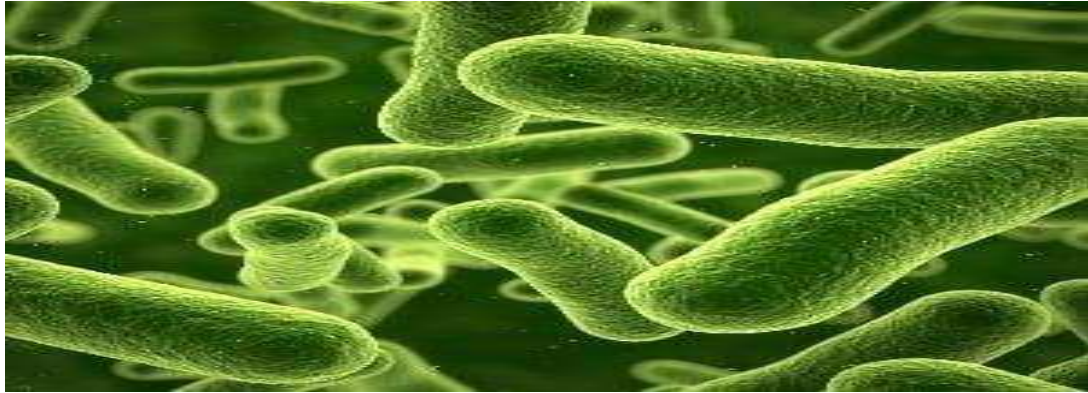


- They build their nests on the top of mountain cliffs.
- They dive deep down the sea to feed on small fish which are the main source of their food.
- The small fish feed on micro-organisms that float on sea surface.

micro-organisms

They are organisms that are too small for people to see with their eyes, they can make their own food, so they are producers and they are found in cold water habitats, because they need this water to survive.

what will happen to micro-organisms if the climate is changed and the water become warmer ?



- Micro-organisms will move toward an area where the water is cooler.
- The small fish that feed on these micro-organism also will move to a new habitat.
- When seabirds will not have a food resource, some of them will move to a new habitat, while others will die.

Classwork exercise on lesson 2

Q1: Choose the correct answer:

- 1- Leakage of oil into seawater negatively affects the.....
a. desert organisms b. marine organisms|
c. forest organisms d. rivers organisms
- 2- Fire in forests produces.....
a. smoke only b. ash only
c. smoke and ash d. oxygen and ash.
- 3- Pollutants produced from a forest fire harm all the following, except.....
a. air b. grasses c. animals d. sunlight
- 4- The suitable habitat for micro-organisms to survive is.....
a. hot water b. cold water c. warm water

Q2: Put (✓) or (✗):

- 1- Forest fire negatively affects the marine organisms. ()
- 2- Death of an animal due to pollution affects all other levels of the food web. ()
- 3- In an ecosystem, all species depend on other species for survival. ()
- 4- Micro-organisms are producers that small fish feed on to get energy. ()
- 5- Seabirds are small fish that swim near to the water surface. ()

Q3: write the scientific term:

- 1- It is the number of organisms of one type of species living in an area. (.....)

Lesson 3: Habitat loss

Habitat means the environment that a living organism live.



- Habitats provide organisms with **food** and **water** that they need.
- Human activities may cause **habitat loss** for many living organisms, such as:

Adding buildings and roads.	Throwing waste in water.	overfishing
		

- Human activities can also impact the weather, such as raising the temperature of the water in some areas of the ocean.

Note:

Habitat loss is one of the main causes of **extinction**.

Coral reefs

- They are one of the most diverse and valuable ecosystem on Earth.



Importance of coral reefs

- 1- They are habitats for many marine organisms.
- 2- They provide food for many marine organisms.
- 3- They are also important of tourism.

As people travel to coral reefs for fishing or diving, providing local hotels, restaurants, and other businesses with visitors and income.

Note:

- Scientists estimate that there may be millions of undiscovered species living and around reefs.

Coral bleaching

- Coral bleaching happens when water temperature rises.



How coral bleaching happens ?

- When water becomes too warm.

1

Corals will get rid of the algae living in their tissues.

2

This causes the coral to turn completely white.

3

Bleaching events stress corals, so they don't survive.

Impact of coral bleaching:

- 1- Coral loss has a negative impact on coral communities and fish communities.
- 2- The human communities that depend on coral reefs and fish for food are also impacted.

How can coral reefs bleaching alert the marine food web?

- 1- Some marine organisms will lose their habitat inside coral reefs.
- 2- Some marine organisms that depend on coral reefs as a food resource will die.

Classwork questions on lesson (3)

Q(1): Choose the correct answer:

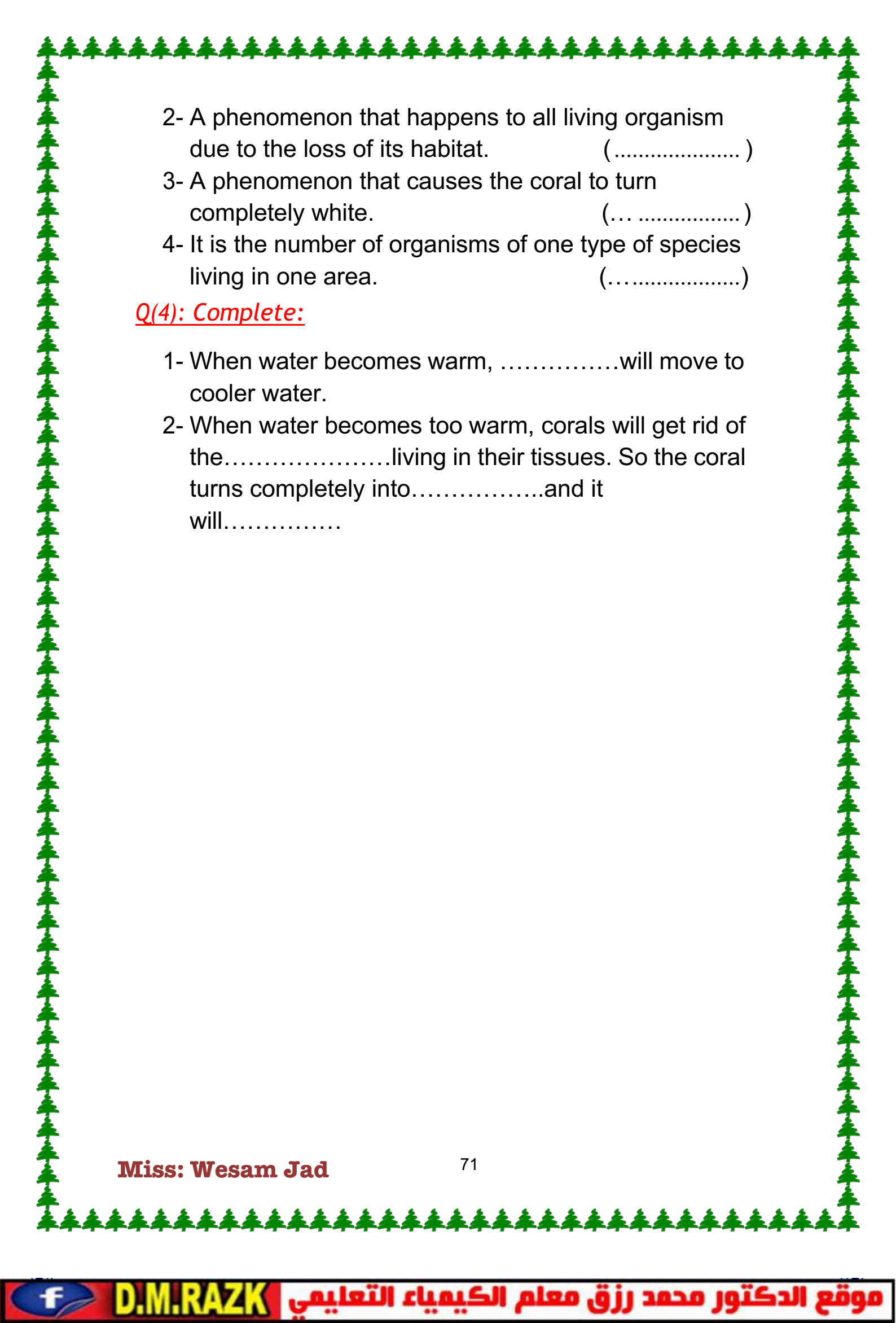
- 1- All the following organisms can make their own food, except.....
a. grass b. algae c. worms d. microorganisms
- 2- If the climate change was suitable, the living organisms will.....
a. die b. migrate c. survive d. go extinct
- 3- Healthy habitats provide animals with.....
a. food b. water c. shelter d. a, b and c
- 4- When the water become warm. The coral color changes to.....
a. black b. yellow c. white d. red
- 5- The loss of habitat for any living organism makes it.....
a. survive b. go extinct c. reproduce d. respire

Q(2): Put (✓) or (/):

- 1- Coral bleaching affects both humans and marine organisms. ()
- 2- Algae enters the tissue of coral when the water temperature increases. ()
- 3- Human impact the animals habitats by building new ways in the forests. ()
- 4- Coral reefs lose their colors when the water temperature decreases. ()
- 5- Habitat loss may cause extinction of any species of animals. ()

Q(3): Write the scientific term:

- 1- The producers of the marine food web. (.....)

- 
- 2- A phenomenon that happens to all living organism due to the loss of its habitat. (.....)
 - 3- A phenomenon that causes the coral to turn completely white. (...)
 - 4- It is the number of organisms of one type of species living in one area. (.....)

Q(4): Complete:

- 1- When water becomes warm,will move to cooler water.
- 2- When water becomes too warm, corals will get rid of the.....living in their tissues. So the coral turns completely into.....and it will.....

Lessons 3 and 4: The effect of plastic products on marine life

Plastic in the sea affect marine life, where whales, sea turtles, seabirds and fish cannot often differentiate between real food and plastic.

1- How do sea turtle get harmed by feeding on plastic?

- Sea turtles cannot differentiate between a jellyfish and a piece of plastic in the water. Therefore, sea turtles eat a lot of plastic thinking that jellyfish, so sea turtles get harmed.



2- How do coral reefs get harmed by feeding on plastic ?

- Due to the effect of UV rays coming from sunlight, plastic products get broken down into smaller pieces called **micro plastics**. When coral reefs filter the seawater to get their food, they ingest these **micro plastics** that are as small as the pieces of food that coral reefs get from the water, so coral reefs get harmed.

Note:

Miss: Wesam Jad

72

- 1- About 8 million tons of plastic are thrown into the marine environment every year.
- 2- Plastics are very harmful to marine organisms **because they are toxic and sharp.**
- 3- People can recycle the plastic products instead of throwing them in the sea.

Coral is an important component of many marine food webs, where it is considered as:

- 1- Food of the variety of primary consumers.
- 2- Shelter for many organisms in the sea. So, loss of coral due to extreme weather or pollution leads to destroying the marine ecosystem.

If the coral reefs disappeared:

- 1- Organisms that depend on coral for food and shelter will die.
- 2- The **parrotfish, triggerfish and butterfly fish** will have nothing to eat, so they will die.
- 3- The **shark** will find a small amount of food to eat, so it also may die.
- 4- The **algae** that live in the coral tissues will lose their habitats.

Habitat restoration:

It is the process of returning a habitat (an environment) back to its natural state before harm was done.

The importance of habitat restoration projects:

- Habitat restoration projects try to repair all parts of the habitat, where they prevent the habitat from "**extinction**".

REBUILDING CORAL REEFS

- One example of restoring a habitat is " **a coral reef rehabilitation project** " that happens in the Arabian Gulf, where:
 - 1- Scientists collect small parts of different species and then move them to a " **nursery** ".



2- **Nursery:**

It is an area in the sea, where scientists take care of small pieces of coral until they grow up and can be moved back to reefs where they were dying.

- 3- The healthy coral reefs can continue growing and reproducing to make new coral reefs again.

PROTECTING CORAL REEFS FROM PLASTIC POLLUTION

- The world-famous coral reefs of the red sea are home to many marine organisms.
- In Egypt, coastal communities near the coral reefs applied a new way of life knowing as a " **Zero plastics** " in these communities:
 - 1- Replace plastic forks with wooden ones.
 - 2- Replace plastic bags with cloth bags.

Classwork questions on lessons 3 and 4

Q1: Choose the correct answer:

- 1- Healthy marine environment is important for survival of.....
 - a. humans b. lions c. fish d. deer
- 2- When water temperature increases, algae leave tissues of....., so they become bleached.
 - a. seabirds b. coral reefs c. clam d. sharks
- 3- Both of sea turtles and.....are present in the same marine food chain.
 - a. deer b. jellyfish c. eagles d. tigers
- 4- Algae in coral reefs provide food for.....directly.
 - a. primary consumers b. secondary consumers
 - c. producers d. top predators
- 5-are living organisms that are negatively affected by pollution of marine ecosystem.
 - a. Whales and lions b. Sharks and tigers
 - c. Elephants and deers d. Algae and fish
- 6- The area in which the scientists take care of small pieces of coral until they grow up is known as.....
 - a. food chain b. food web c. grassland d. nursery

Miss: Wesam Jad

75

- 7- All the following processes show coral reefs in healthy conditions, except.....
 a. growing b. bleaching c. reproducing d. filtration
- 8- " Zero plastics " project that is applied in Egyptian coastal communities, means that the using of plastic products decreases by.....
 a. 0 % b. 10 % c. 90 % d. 100 %

Q2: Put (✓) or (/):

- 1- When the temperature of seawater decreases, coral reefs receive more algae. ()
- 2- Jellyfish can get its energy by eating the sea turtle. ()
- 3- UV rays coming from the sun, break down plastic wastes into micro plastics. ()
- 4- The polluted water has a positive effect on coral reefs. ()
- 5- Coral reefs depend on butterfly fish for food and shelter. ()
- 6- Removing plants negatively affects consumers in an ecosystem. ()
- 7- Restoration projects are used to find out solutions for increasing pollution. ()
- 8- People near the coastal areas must replace plastic bags with cloth one. ()

Q3: Write the scientific term:

- 1- They are rays coming from the sun that break down plastic products into micro plastics. (.....)
- 2- Small pieces of plastics in the size of rice grains and they cause harms to marine organisms.
 (.....)

- 3- They are projects in which scientists, engineers and citizens try to repair all parts of a habitat.
(.....)
- 4- It is an area in the sea, where scientists take care of small pieces of coral until they grow up.
(.....)

Q4: Complete the following sentences using these words:

(extinction – overfishing – shelter – toxic – predator)

- 1- Healthy natural resources include clean air, healthy food, water and suitable.....
- 2- The human activity that directly decreases the marine population is.....
- 3- Habitat loss is not only decrease marine population but also it is one of the main causes of.....
- 4- When a sea turtle eats a jellyfish, this means that the sea turtle is a.....living organism.

Q5: Give reasons for:

- 1- Coral reefs are important for human communities.
.....
.....
- 2- When we remove plants from riverbanks, the floods become more dangerous.
.....
.....

Homework questions on lessons 4,5 and 6

Q1: Choose the correct answer:

- 1- Coral reefs bleaching negatively affects.....
directly.
a. parrotfish only b. triggerfish and parrotfish
c. butterfly fish and shark d. triggerfish only
- 2- The place in which we can take care of small pieces
of coral until they grow up is located in.....
a. seas b. air c. desert d. forests
- 3- To reduce pollution, we have to replace white plastic
forks with.....
a. wooden forks b. black plastic forks
c. yellow plastic forks d. green plastic forks
- 4- Coral reefs are considered as resources of.....
a. food only b. shelter only
c. food and shelter d. food and pollution
- 5- As a result of coral reefs bleaching, they will be.....
a. increased b. enlarged c. survived d. died
- 6- When coral reefs.....the seawater, they may
ingest micro plastics.
a. evaporate b. filter c. cool d. warm

Q2: Write the scientific term:

- 1- A process of returning a habitat back to its natural
state before harm was done. (.....)
- 2- It is a condition in which coral reefs turn completely
into white. (.....)

Q3: Put (✓) or (/):

- 1- The flow of energy in food webs is not affected when
the natural habitats are destroyed. ()

- 2- Living organisms in seas and oceans cannot differentiate between real food and plastic waste materials. ()
- 3- Coral reefs are considered as a suitable habitat for sharks. ()
- 4- Citizen must share in returning a habitat back to its healthy condition before harm was done. ()

Q4: Give reasons for:

- 1- Both of rising water temperature and ingestion micro plastics are harmful for coral reefs.

.....
.....

- 2- It is better to keep natural resource healthy than applying restoration projects.

.....
.....

Unit 2: Particles in motion

Concept 2.1: Matter in the world around us

Concept 2.1: Lesson 1 and 2

Matter:

It is anything that has a mass and takes up space.

- Everything around is made up of **matter**.

Matter exists in three states which are:

- 1- Gaseous state → air.
- 2- Liquid state → seawater.
- 3- Solid state → rocks.

Each state has its **own properties**.

Water is the best example to show the three states of matter because it exists everywhere around us.

States of water

Solid (ice cube)	Liquid (water)	Gas (Water vapor) steam
		

- Ice changes into water by heating.
- Water changes to ice by freezing.

PROPERTIES OF MATTER

Miss: Wesam Jad

80

All properties of matter help us describe matter, such as:

1- Hardness

Hard.
ex: Brick.

Soft.
ex: Feather.

2- Temperature

Hot.
ex: A cup of tea.

Cold.
ex: Ice

3- Shape

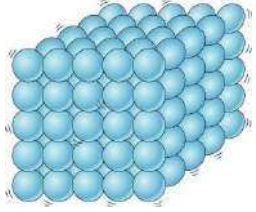
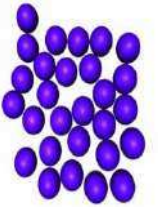
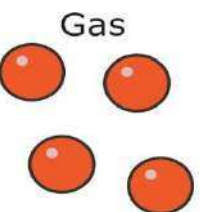
some matter
is round, like
a ball.

some matter
is square,
like a brick.

4- Size (volume)

too small

big

	Solid	Liquid	Gas
Size	Definite	Definite	Indefinite
shape	Definite	Indefinite	Indefinite
Shape of particles			
Spaces between particles	Very close. (packed tightly)	They have more space.	They have a lot of space.
Energy of particles	Less energy.	More energy.	A lot of energy.
Motion of particles	Move a little bit.	More freely	Very freely.

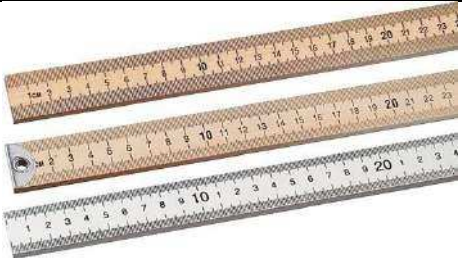
Notes:

- 1- **Light** and **sound** are not matter, but they are considered forms of **energy**.
- 2- All matter is made up of **tiny identical particles** that are in **continuous motion**.
- 3- How much the particles are moving → determines the state of the matter.

MEASURING AND OBSERVING MATTER

All matters can be observed and measured by using devices, such as:

Type	Tool	Picture
------	------	---------

Length.	Measuring tape / metric stick.	
Mass.	Balance scale.	
We can observe the air filling up a balloon and measure how much the balloon expands as it is filled with water.		
Temperature.	thermometer	

Classwork questions

Q1: choose the correct answer:

- 1- Anything that has mass and occupies. space is called.....
a. energy b. force c. matter d. weight
- 2- All the following examples represent solid states, except.....
a. blood b. feathers c. humans d. rocks
- 3- Matter can be described by their.....
a. hardness b. color c. shape d. a, b and c
- 4-is considered an invisible matter.
a. Water b. Sound c. feather d. water vapour
- 5-is a substance that can be poured in any container.
a. Oxygen b. Juice c. Ice d. Air
- 6-are the same matter, but they exist in different states.
a. Wood and brick b. Oxygen and air
c. Oil and tea d. Ice and water vapour
- 7- Tiny particles inside.....move very freely.
a. water b. air c. wood d. ice
- 8- You can measure your height by using a.....
a. balance b. thermometer
c. measuring cup d. measuring stick

Q2: Put (√) or (X):

- 1- Any matter can change to another matter. ()
- 2- Milk takes the shape of the container that is poured in. ()
- 3- Water vapour has no texture and it is invisible matter. ()

- 4- The particles in ice move more freely than in water. ()
- 5- We can see particles inside the matter with the naked eye. ()
- 6- Solid matter takes the shape of the container that it is poured in. ()

Q3: Write the scientific term:

- 1- Anything around us that has mass and occupies space. (.....)
- 2- A state of matter in which something has a definite shape. (.....)
- 3- A state of matter that can be poured in a container. (.....)
- 4- A device that is used to measure the temperature of the milk. (.....)
- 5- A process in which ice changes into water. (.....)

Q4: Complete:

- 1-,andare examples of gaseous states.
- 2- Light and sound are not.....but they are considered forms of.....
- 3- Matter can exist in.....stated that are..... ,and.....
- 4- Matter can be described by using..... ,or.....
- 5- The particles inside a.....matter are packed up tightly together.

Q5: Give reasons for:

- 1- Air is a matter.
.....

Homework questions

Q1: choose the correct answer:

- 1- Water in nature exists in.....state(s).
a. 1 b. 2 c. 3 d. 4
- 2- Matter consists of identical.....in a state of motion.
a. cells b. particles c. nutrients d. proteins
- 3- Cold milk and hot tea are similar in.....
a. color b. taste c. smell d. temperature
- 4- Which matter has a definite shape?
a. Water b. Ice c. Oil d. Air
- 5- Thermometers can be used to know the.....of water.
a. shape b. color c. weight d. temperature
- 6- Which of the following doesn't have a texture?
a. air b. ice c. wood d. rock

Q2: Put (✓) or (X):

- 1- Matter consists of tiny moving particles. ()
- 2- The particles inside wood are packed tightly together. ()
- 3- Water has no definite shape and size. ()
- 4- Ice melts into water by cooling it. ()
- 5- Matter exists everywhere around us in nature. ()

Q3: Write the scientific term:

- 1- They are located inside any matter in continuous motion. (.....)
- 2- A device that is used to measure the height of a boy. (.....)
- 3- A process in which water changes into ice. (.....)

Lessons 3,4 and 5

- All matters are made of **particles**.
- Matter can exist in **3 different states** (solid – liquid – gas).
- All matters can take up a space.
- No two matters can take up the same space at the same time.
- Matter is usually something that we can **feel**, **see** or even **smell**.
- Some matters are **too small** and we cannot see it with the human eye, like **air** or **germs**.

PARTICLES OF MATTER

Particle is the building unit of matter.

Particles in solids	Particles in liquids	Particles in gases
- Particles are packed closely and cannot escape into space. - They vibrate around their space, but they are held together, so they do not move from a place to another.	- Particles are held together more loosely and can move and slide past each other. - They can take the shape of their container. - Particles in a liquid can move faster than the	- Particles cannot held together. - They spread out to fill up any container they are put in. - They can move very quickly.

	particles in a solid.	
--	-----------------------	--

THE SIZE OF THE PARTICLES DEPENDS ON:

- 1- They type of the particles.
- 2- How it's connected with neighboring particles.

Note:

The average size of a particle is so tiny that:

One hair = 150000 to 300000 particles.

HOW CAN WE SEE EACH PARTICLE ?

- By electron microscopes.

Note:

The microscope you have in a science classroom are not powerful enough for us to see them.

Microscope	Electron microscope
	

HOW CAN WE SHOW THAT THE PARTICLES EXIST?

Model 1: Think about what happens when you blow up a balloon.



- 1- Particles of gases move very quickly.
- 2- They bounce against the inside balloon. This exerts a force that inflates the balloon and creates its round shape.
- 3- If you squeeze the balloon, you can make it smaller by pushing the particles closer together.
- 4- If you squeeze the balloon too hard, the balloon pops, and the particles escape into the air.

MODEL 2: A GLOBE IS A MODEL



A globe is used as a model of Earth. It is not a real planet, as it shows us:

- 1- The shape of the Earth.
- 2- How much of the Earth is covered with oceans.
- 3- Where different countries are located.

IMPORTANCE OF MODELS

It helps us to:

- 1- Understand things we cannot easily see.
- 2- See many things at the right size.

Models help us look at **big** things → Solar system model.

Models help us look at **small** things → Germs model.

Models help us **understand how things work** → Models of volcanoes as they show us the shape of volcano and how ooze liquid comes out during a real eruption.

STATES OF MATTER DURING COOKING

- Cooking is one of the careers that depend on the three states of matter.
- As they use heat to **boil** water.
- They can **freeze** some vegetables because freezing keeps them fresh and ready to use for longer periods of time.

Classwork questions

Q1: choose the correct answer:

- 1- In order to study the planets, you must use a.....
a. microscope b. model
c. magnifying lens d. metric ruler
- 2-is the process of preserving vegetables to be fresh.
a. Heating b. Cooling
c. Freezing d. Condensation
- 3- The model which shows us all the planets is called.....
a. solar system model b. globe
c. spaceship d. small model
- 4- Some matters are very small and we cannot see them, such as.....
a. water b. germs c. pencil d. insects
- 5- The speed of motion of particles is arranged from the slowest to the fastest in:.....
a. wood – air – oil b. oxygen – milk – iron
c. ice – water – water vapor
d. rocks – rivers – mountains

Q2: Put (√) or (X):

- 1- Your body is made of matter. ()
- 2- Solids keeps its shape when they move from one place to another. ()
- 3- Two objects can take up the same space at the same time. ()
- 4- Astronauts cannot see most of Earth while riding a spaceship. ()
- 5- Freezing keeps food ready to use for shorter periods of time. ()

- 6- A globe is a real planet. ()
- 7- Models help us see germs without a microscope.()

Q3: Write the scientific term:

- 1- Special microscopes that are used to see individual particles. (.....)
- 2- It is a copy that is similar to the real thing. (.....)
- 3- The state of matter in which the particles take the shape of the container. (.....)

Q4: Complete:

- 1- Matter is anything that has a..... and occupies
- 2-particles move freely than liquid particles.
- 3-ooze liquid to model what happens during a real eruption.
- 4- When you blow a balloon, gas particles exert..... That inflates the balloon.
- 5-model shows us all the planets, while.....model shows us the Earth only.

Q5: Give reasons for:

- 1- The importance of solar system model.
- 2- The importance of a glob.
- 3- Gases can escape into space.

Concept 2.2: Describing and measuring matter

Lessons 1 and 2

Q: What materials are the roofs made of ? And how are they useful ?

- THE SHAPES OF THE ROOFS DIFFERS ACCORDING TO WHERE SOME OF THEM ARE:

- 1- Flat to reflect sunlight.
- 2- Inclined (slanted) to make rain and snow slide on it.

EXAMPLES

	Desert home	Cold weather home	Tropical rainforest home
Figure			
The roof is made up	Strong stones.	Ceramic tiles (bricks).	Leaves and sticks.
properties	Flat	Inclined	Inclined
To protect home from	Dust and dirt.	Rain and snow.	Animals getting inside.

The importance of the different shapes of roofs:

- The roofs protect homes from dust, dirt, rainwater and animals.

NOTE:

- 1- The kind of material that the roof is made of depends on the climate where the home is located.
- 2- The roofs should be strong and not fall when the wind blows or rain.

We can describe any matter by its properties, such as:

(Color – shape – texture – odor – volume).

Measuring matter

MEASURING TAPE	BALANCE SCALE	MEASURING CUP	THERMOMETER
			
To measure length.	To measure mass.	To measure volume.	To measure temperature.

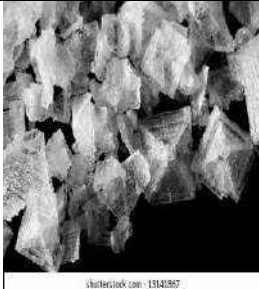
- Measuring matter helps us to know the suitable use of it.

DESCRIBING THE MATTERS

To describe any matter we can use:

(Color – Shape – Odor and texture) as they are the physical properties of matter

To compare between (sugar – salt – flour) according to the size of crystals, we will find that:

	SUGAR	SALT	FLOUR
SIZE OF CRYSTALS	Large	Small	Fine
			

- Some physical properties such as Color, Shape, Odor and texture can be observed by **our five senses**.
- Some physical properties such as volume, temperature and mass can be measured by **special tools**.

PROPERTIES OF MATTER

Physical properties	Chemical properties
They are the properties that can be observed or measured without any change in the matter .	They are the properties that describe how matters interact with each other and the material changes into another substance .
Examples:	Examples:

Color – shape – odor – mass – volume – texture – temperature.	- The ability to burn paper and changing it to ash.  - The ability of iron to rust. 
---	--

	MASS	VOLUME
DEFINITION	It is the amount of matter in the object.	It is the amount of space that matter takes up.
MEASURING UNITS	1- Liters (L): it equals a big bottle of soda or juice. 2- Milliliters (mL). 3- Cubic centimeters (cm ³). 1 L= 1000mL = 1000 cm ³	1- Gram (g): it equals the mass of one paper clip.  2- Kilogram (kg): it equals the mass of one liter of water.

One liter of water = a mass of 1 kilogram

Miss: Wesam Jad

Temperature:

It measures how quickly the particles in a substance are moving.

- It can be measured by using a **thermometer**.



- Quick-moving particles produce more heat energy than slow-moving particles.

Classwork questions on lessons 1 and 2

Q1: Choose the correct answer:

- 1- The.....used to measure the volume of milk.
a. thermometer b. balance
c. measuring cup d. metric ruler
- 2- We can observe the.....of matter without using tools.
a. volume b. length c. taste d. temperature
- 3- The roof of cold weather home is.....
a. flat b. inclined
c. made of ceramic bricks d. b & c
- 4- The roof of homes can be made from all the following materials, except.....
a. stone b. leaves c. sand d. sticks

Miss: Wesam Jad

97

- 5- We use a measuring tape to measure the....of matter.
a. volume b. length c. mass d. temperature
- 6- Texture and shape of matter can be observed by....
a. ruler b. balance
c. our senses d. thermometer
- 7- Which of the following describes the physical change of matter?
a. burning of paper b. rust of iron
c. burning of match d. cutting wood
- 8- Mass is measuring the.....of matter.
a. odor b. amount c. length d. color
- 9- The mass of one liter of water equals.....
a. 1000cm³ b. 1000g c. 1000mL d. a & c

Q2: Put (✓) or (X):

- 1- Iron rusting is considered a chemical property. ()
- 2- Quick-moving particles can give off less heat energy than slow-moving particles. ()
- 3- The roofs of desert homes are made of strong stones to protect them from snow. ()
- 4- Measuring cups can be used to measure the volume of liquids. ()
- 5- A thermometer can tell you if the milk is cold or hot. ()
- 6- The roofs of tropical rainforest homes are made of leaves and sticks. ()

Q3: Write the scientific term:

- 1- A device that is used to measure the temperature.
(.....)
- 2- A device that is used to measure the mass.
(.....)

- 3- They are the properties that can be measured or observed without a change in the nature of matter.
(.....)
- 4- It is the amount of matter in the object.
(.....)

Q4: Give reasons for:

- 1- Burning paper is a chemical change in matter.
.....
.....

Classwork questions on lessons 1 and 2

Q1: Complete:

- 1- A chemical property of paper is that it is.....
- 2- From the measuring units of mass are.....and.....
- 3- When paper is lit on fire, it becomes.....
- 4- From the examples of physical properties are..... ,
.....and.....
- 5- Alcohol and vinegar are different in....., while
black and white clothes are different in.....
- 6- We measure.....using a measuring cup, while
we measure mass using.....

Q2: Choose the correct answer:

- 1- The roof of.....homes is made of leaves and sticks.
a. cold weather b. tropical rainforest
c. desert d. underground
- 2- All the following are considered physical properties of matter, except.....
a. color b. shape c. texture d. rusting
- 3- Volume is the amount of.....that matter takes up.
a. time b. space c. matter d. temperature

4- The suitable unit to measure the volume of a piece of iron is.....

- a. cm b. meter c. gram d. cm^3

Q2: Put (✓) or (X):

- 1- We can observe some physical properties using our five senses. ()
- 2- The metric ruler helps us to see the crystals inside an iron piece. ()
- 3- The inclined roof makes snow and rain slide over it. ()

Q4: Write the scientific term:

- 1- A device that is used to measure volume. (... ..)
- 2- They are properties that describe how matter interacts with other matter. (... ..)
- 3- It is a property that measures how quickly the particles in a substance are moving. (... ..)

Concept 2.2: Describing and measuring matter

Lessons 3 and 4

Measuring the different properties of matters such as (mass – density – length – magnetic property)

Property	Wooden block	Iron nail	Cork	Stone
Attracted to the magnet or not.	Not attracted	Attracted	Not attracted	Not attracted
Sink or float.	Float	Sink	Float	Sink
Mass	80 gm	20 gm	40 gm	70 gm

Conclusion:

- 1- Some substances are attracted to the magnet and some not.
- 2- Some substances float on water surface and some others sink in water.

Q: Does the change in the shape and size affect the object's mass ?

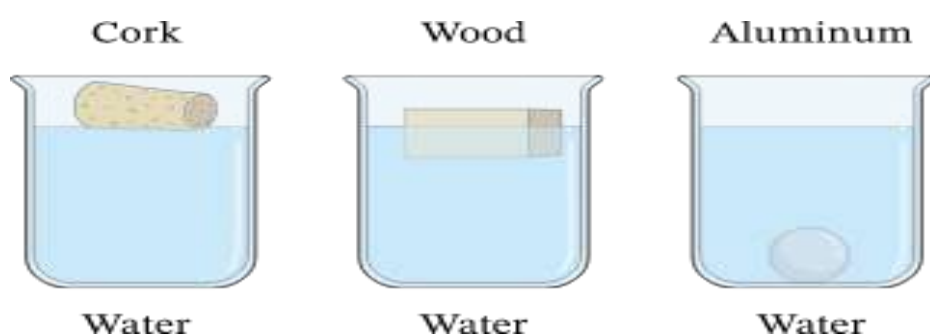
- 1- The change in the shape doesn't affect the mass of the object.
- 2- The change in size affects the mass of the object.

Density of a substance:

It is a property that shows if an object floats or sinks in another matter.

1- If the substance has density **less than** the liquid, it will **float** on the liquid.

2- If the substance has density **more than** the liquid, it will **sink** in the liquid.



Note:

- 1- We can distinguish between iron and copper by their color.
- 2- Changing the volume of an object does not affect most of its physical properties, but the mass of the substance will change.
- 3- The density of a substance does not change, but the object may not float on water after dividing it, such as a table tennis ball.
- 4- It is thought that big objects should have greater mass than small objects, but when we look at the baseball and the empty milk bottle, the baseball has greater mass than that of the empty milk bottle.

USEFUL PROPERTIES OF MATTERS

Helium	Properties	Uses
	-Helium is a gas which is lighter than air. -It is safe to be used, because: 1- It is not poisonous (chemical property). 2- It is not flammable (chemical property).	1- To fill balloons 2- To fill blimps.
Copper	Properties	Uses
	- Copper conducts electricity and heat well. (physical property). - It can be stretched into a thin flexible wire. (Physical property).	It is a metal that is used to make: 1- Electric wires. 2- Cooking pots.

Glass	Properties	Uses
	Glass is a transparent material.	1- Windows. 2- Light bulbs. 3- Eyeglasses.

GIVE REASONS FOR:

- Cooking pots are made of metals.**
Because metals are good conductors of heat.
- Handles of cooking pots are made of plastic or wood.**
Because plastic and wood are bad conductors of heat.

Conduction:

It is the ability of the substance to transfer heat and conduct electricity.

Matter	Properties	Uses
1- Steel	Hard Strong	- Hammers - Screwdrivers
2- Rubber	Waterproof Flexible	- Tires - Gloves - Athletic shoes

Classwork questions on lessons 3 and 4

Q1: Choose the correct answer:

- 1- Iron and copper are different in.....
a. taste b. odor c. smell d. color
- 2- All the following are attracted to the magnet, except.....
a. nails b. iron c. aluminum d. paperclips
- 3- The.....of a substance is a property that shows if object floats or sinks in a liquid.
a. shape b. texture c. density d. temperature
- 4- One of the chemical properties of helium gas is that it is.....
a. not flammable b. lighter than air
c. not poisonous d. all the previous
- 5- Wood cannot be used to make cooking pots, because it is.....
a. solid b. bad conductor of electricity
c. flexible d. good conductor of electricity
- 6- Parachutes are operated by.....gas.
a. oxygen b. hydrogen c. helium d. oxygen

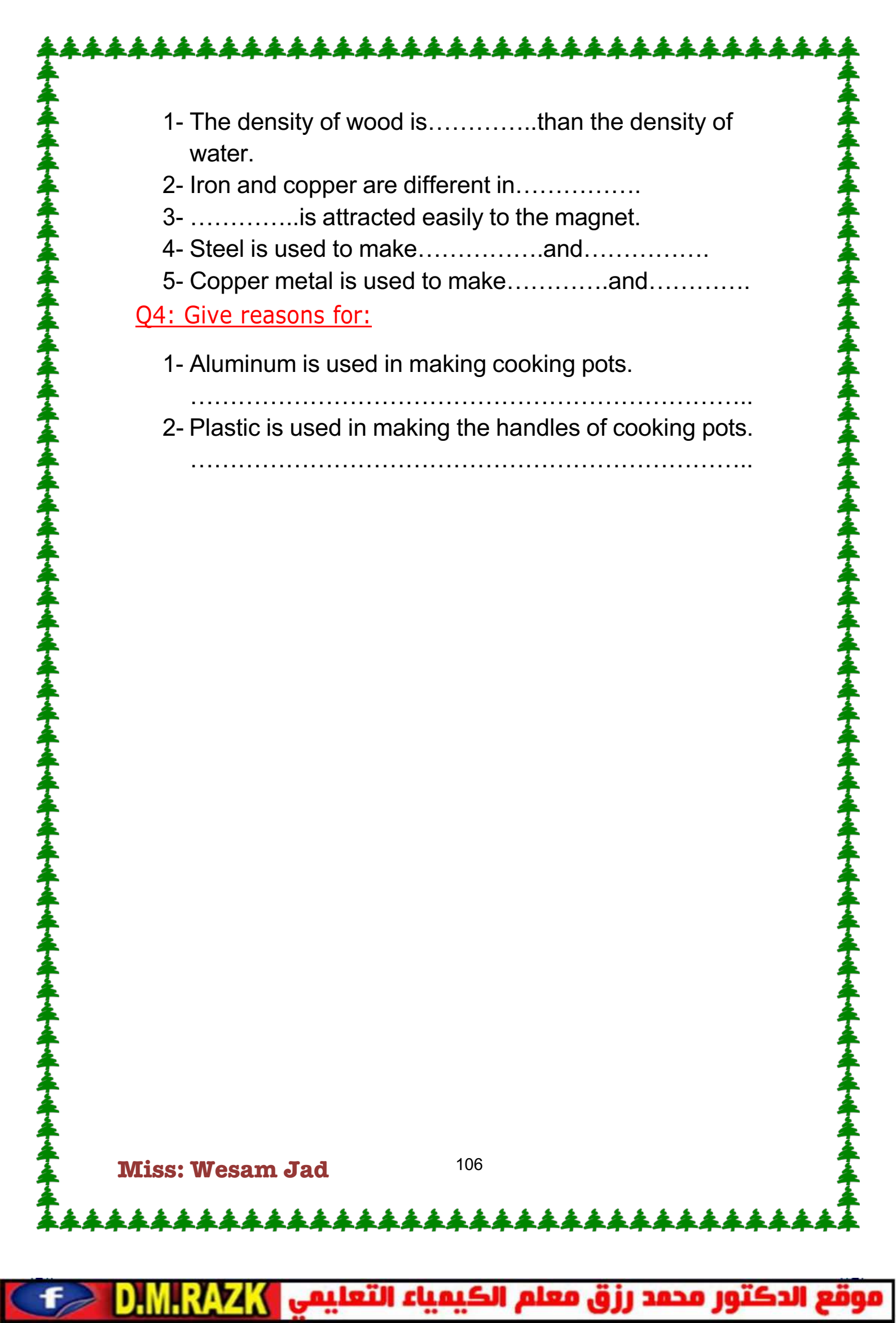
Q2: Put (✓) or (X):

- 1- Too much baking soda will ruin a cake. ()
- 2- Waterproof gloves are made of rubber. ()
- 3- Copper cannot be stretched into a thin, flexible wire. ()
- 4- Strong hammers are made of copper. ()
- 5- Changing the volume of a substance may affect all other physical properties. ()
- 6- If the density of water is less than the density of an iron piece, the iron piece will float. ()

Q3: Complete:

Miss: Wesam Jad

105

- 
- 1- The density of wood is.....than the density of water.
 - 2- Iron and copper are different in.....
 - 3-is attracted easily to the magnet.
 - 4- Steel is used to make.....and.....
 - 5- Copper metal is used to make.....and.....

Q4: Give reasons for:

- 1- Aluminum is used in making cooking pots.
.....
- 2- Plastic is used in making the handles of cooking pots.
.....

Homework questions on lessons 3 and 4

Q1: Choose the correct answer:

- 1- Glass is used to make medical glasses because it is.....
a. transparent b. opaque c. flexible d. hard
- 2- One of the characteristics of helium gas is being.....
a. heavier than air b. poisonous
c. not flammable d. all the previous
- 3- Changing the volume of a piece of iron may affect its.....
a. mass b. color c. taste d. texture
- 4-floats on water surface.
a. iron b. copper c. aluminum d. wood

Q2: Put (✓) or (X):

- 1- Matter which takes up a wider area must have greater mass. ()
- 2- Aluminum foil and wood are not attracted to the magnet. ()
- 3- Cooking pots are made of wood. ()
- 4- A balloon filled with helium gas rises up in the air. ()
- 5- Copper and rubber are flexible materials. ()

Q3: Write the scientific term:

- 1- They measure the size and shapes of fossils. (.....)
- 2- They measure and map Earth's surface. (.....)
- 3- A strong and hard metal that is used to make screwdrivers and hammers. (... ..)

Concept 2.3: Comparing changes in matter

Lessons 1 and 2

Q: What happens when ice is left out of the fridge ?

Ice begins to melt, it changes from the solid state into the liquid state.

Q: What happens to the mass of a substance when it is heated or cooled ?

The mass doesn't change.

This means that changing the temperature affects the shape and state of the matter, but it doesn't affect the mass of the matter.

THE RELATIONSHIP BETWEEN TEMPERATURE AND MELTING

- Ice melts quickly when the temperature **increases**.

Melting:

It is a process in which matter is changed from a solid state to a liquid state by heating.

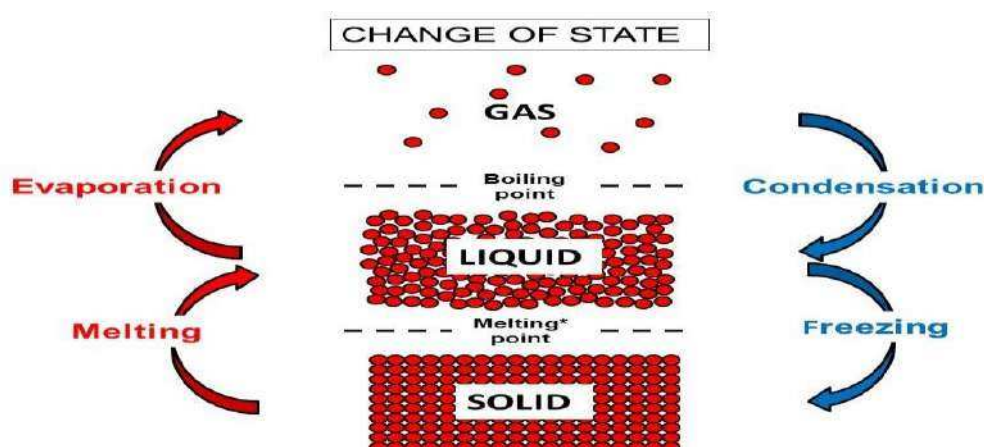
NOTE:

- 0° C it is the suitable temperature to keep the ice in its solid state.
- Water changes into ice by cooling, while ice changes into water by heating.

STATES OF MATTER

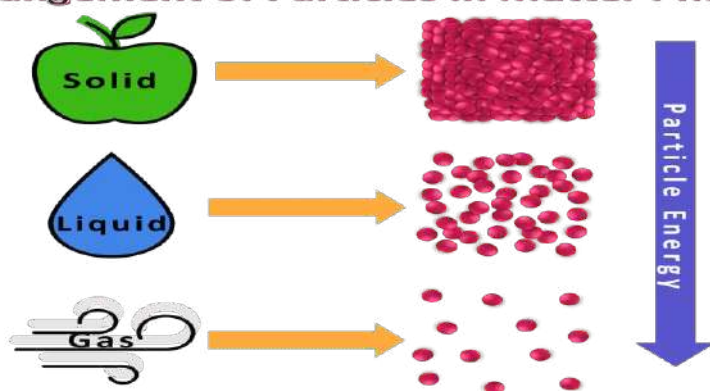
	Solid	Liquid	Gas
Shape	Definite shape.	Takes the shape of the container.	Takes the shape of the container.
Volume	Definite volume.	Definite volume.	Takes the shape of the container.
Examples	Ice – wood – iron – copper	Water – oil – milk – vinegar	Air – water vapor – oxygen

CHANGES IN MATTER



Q 1: DOES THE NUMBER OF PARTICLES INSIDE MATTER CHANGE WHEN THE MATTER STATE CHANGES ?

Arrangement of Particles in Matter Phases



By changing the state of matter:

The total number of particles in matter doesn't change.

The number of particles in the solid state = The number of particles in the liquid state.

Q2 : DOES THE MASS OF MATTER CHANGE BY CHANGING ITS STATE ?

- The mass of the matter remains constant (doesn't change).

Thermal (Heat) Energy

- Thermal energy is not a physical thing, but it is considered from energy.
- Thermal energy from the sun keeps living things on Earth alive.

Uses of thermal energy:

1- Warming houses.

2- cooking food.

Matter:

It is anything that has mass and takes up space.

- Matter consists of very small **particles** which have energy that makes matter move, vibrate and spin.

PARTICLES IN MOTION

When the matter absorbs thermal energy:

- 1- The particles in the matter move, vibrate and spin faster.
- 2- The object becomes warmer when you touch it.

So, when the matter absorbs the thermal energy:

- 1- The speed of the particles increases.
- 2- Kinetic energy increases.
- 3- Thermal energy increases.

When matter is heated:

Particles move faster and become far from each other.

When the matter is cooled:

Particles move slower and become close to each other.

THE EFFECT OF TEMPERATURE ON THE STATE OF MATTER

States of matter change by changing the temperature of matter :

- 1- By **heating** (increasing the temperature), the solid state changes into a liquid state.

2- By **cooling** (decreasing the temperature), the liquid state changes into a solid state.

Notes :

In melting:

- 1- The small pieces melt faster than the large pieces.
- 2- The chocolate cannot return to its original shape after melting, because it takes the shape of the container.

Relationship between temperature and state of matter

The states of matter depend partly on its temperature.

- Temperature measures how much the particles inside the matter have energy, as the energy of particles determines how much the particles move (fast or slow) and also the state of the matter.

NOTES:

- 1- Water is a liquid between 0°C and 100°C .
- 2- The freezing point of water is 0°C .
- 3- Melting and freezing are **physical changes**.
- 4- Increasing or decreasing the temperature can also cause **chemical changes**.

Melting	Freezing
When the temperature of ice rises above 0°C , ice particles gain energy and move faster .	When the temperature of ice is cooled below 0°C , ice particles lose energy and move slower .

Classwork questions on lessons 1 and 2

Q1: Choose the correct answer:

- 1- Which of the following happens when the ice cubes melt ?
a. temperature decreases b. mass decrease
c. temperature increases d. mass increases
- 2- All the following changes occur during the melting process, except the.....
a. temperature b. state c. mass d. shape
- 3- The.....process means that ice changes into water.
a. boiling b. freezing c. melting d. condensation
- 4- The mass of the ice before melting is.....its mass after melting.
a. more than b. less than
c. equal to d. no correct answer
- 5- Matter consists of smaller units called.....
a. blood b. protein c. tissues d. particles
- 6-has a fixed volume and takes the shape of the container.
a. Iron b. Oxygen c. Wood d. Milk
- 7- The reason of the ice melting is due to increasing in the.....
a. temperature b. color c. mass d. shape
- 8- Melting is a physical change that is opposite to the....
a. condensation b. freezing
c. heating d. evaporation

Q2: Put (√) or (X):

- 1- Melting is a chemical change that can be reversed by cooling. ()
- 2- As the particles of liquid water lose energy, they slow down and become gaseous ice. ()

- 3- Temperature affects the state of matter. ()
- 4- Ice begins to melt at 100°C . ()
- 5- Heat is not a physical thing, but it is a form of energy. ()

Q3: Complete:

- 1- In the.....process, liquid changes into solid.
- 2- When substances are cooled or heated, their.....
do not change.
- 3- Heat is a form of.....that we use every day in
many things, such as.....and.....
- 4- Water is a liquid between..... $^{\circ}\text{C}$ and..... $^{\circ}\text{C}$.

Q4: Give reasons for:

- 1- When the matter state changes, the amount of matter
doesn't change.
.....
.....
- 2- Ice melts faster when we expose it to heat.
.....
.....

Q4: Write the scientific term:

- 1- A property of matter which doesn't change when
matter is heated or cooled. (... ..)
- 2- It is measuring of how much energy that the particles
have. (... ..)
- 3- It is a change of matter that can be reversed by
freezing. (... ..)

Homework questions on lessons 1 and 2

Q1: Classify the following statements into physical or chemical change:

- 1- Melting a bar of chocolate. (.....)
- 2- Paper changing to ash. (.....)
- 3- Putting milk in the fridge. (.....)
- 4- Iron rusting. (.....)

Q2: Choose the correct answer:

- 1- Particles inside butter lose energy during the.....process.
a. melting b. freezing c. evaporation d. heating
- 2- Water is a.....between 0 ° C to 100 ° C.
a. solid b. liquid c. gas d. vapor
- 3-has definite shape and volume.
a. Milk b. Wood c. Oil d. Oxygen
- 4- When.....in a polar region, the ice begins to melt.
a. wind blows b. temperature increases
c. rainfalls b. temperature decreases
- 5- The states of matter depend on the change in the..... of the matter.
a. mass b. odor c. temperature d. color

Q3: put (✓) or (X):

- 1- Thermal energy increases the speed of the melting of ice. ()
- 2- The mass of a substance does not change when it is heated. ()
- 3- Melting happens when the temperature of ice rises above 0 ° C. ()
- 4- Melted chocolate in a plastic bag returns into its original shape by cooling. ()

Concept 3: Comparing changes in matter

Lessons 3 and 4

What's matter ? and changing states:

BY COOLING	BY HEATING
By cooling, particles lose energy , so they slow down and move together.	By heating, particles gain energy , so they vibrate and move faster.

- The extra energy allows the particles to change a different state.

Changing water state

P.O.C	MELTING	FREEZING
DEFINITION	The change of matter from a solid state into a liquid state by heating .	The change of matter from a liquid state into a solid state by cooling .
EXPLANATION	When ice is heated it gains thermal energy, so the particles move faster and separate , so it changes into liquid .	When water freezes , it loses thermal energy, so the particles move slower and get closer , so water changes into solid .
		

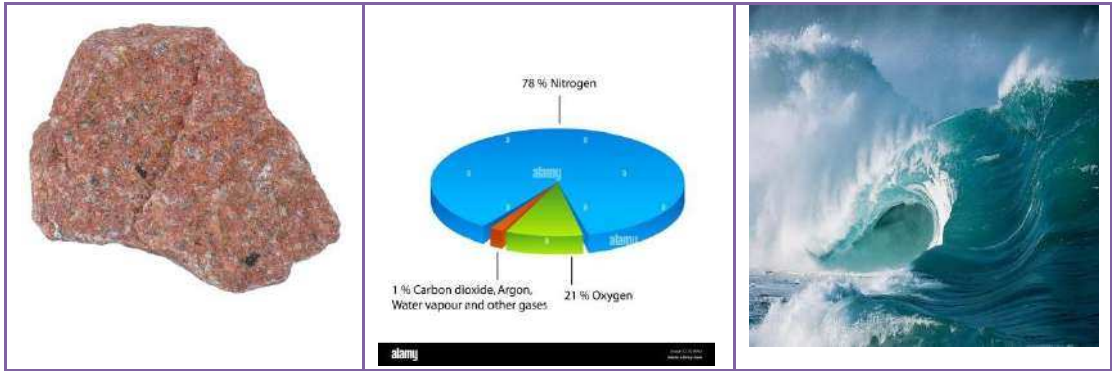
P.O.C	EVAPORATION	CONDENSATION
DEFINITION	Change of matter from the liquid state to the gaseous state by heating.	Change of matter from the gaseous state to the liquid state by cooling.
EXPLANATION	When water is heated it gains thermal energy, so the particles move faster and separate more , so it changes into steam .	When vapor is cooled , it loses thermal energy, so the particles move slower and get closer , so water changes into liquid .
		

MIXTURES IN NATURE

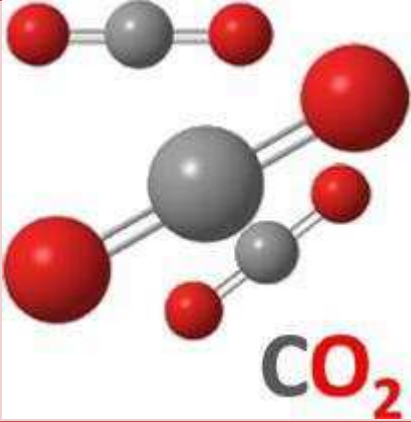
A mixture consists of two different matter or more and it has different kind of particles.

EXAMPLES:

PINK GRANITE	ATMOSPHERE	OCEAN WATER
Consists of different types of metals with different colors .	Consists of 3 different gases "nitrogen – oxygen – other gases".	Consists of "water – dissolved salts – other materials.



MIXTURES AND COMPOUNDS

P.O.C	MIXTURES	COMPOUNDS
DEFINITION	It is a form of matter made of two or more parts that cannot combine chemically. (Its parts don't change and keep their own identity).	It is a form of matter made of two or more parts that can combine chemically. (Its parts change and form a new substance).
EXAMPLES	Mixture of water and sugar (sugary solution).	Carbon dioxide gas is formed from one carbon atom and two oxygen atoms.
		

PROPERTIES OF COMPONENTS INSIDE MIXTURES:

- 1- Each component keeps its own properties, as they don't lose their color, smell and taste.
- 2- Components don't combine chemically, so no new matter is formed.
- 3- Components can be separated physically by different methods.

NOTES:

Some components inside mixtures **can be seen** by eyes, such as mixtures of nuts.

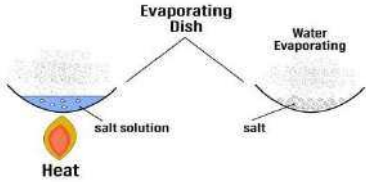
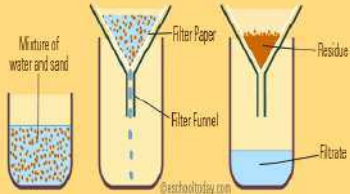


Some components inside mixtures **cannot be seen** by eyes, such as mixtures of air.



Mixtures can be made up of

Solid materials	Liquid materials	Gaseous materials
1- Mixtures of nuts. 2- Mixtures of sand and rocks.	1- Mixtures of salt and water. 2- Mixtures of sugar and water	Atmosphere (air)

	EVAPORATION	FILTRATION
	It is used to separate materials and evaporate at different temperature.	It is used to separate materials that has smaller particles from other materials.
EXAMPLE S	Separation of salt from water.	Separation of sand from water by filter paper.
		

- We can separate metallic paperclips from sand by **magnet.**

2- A separation method that is used to separate sand from water. (.....)

Q4: Complete:

- 1-and.....are examples of mixtures, while.....is a compound.
- 2- Matter can change from one state to another whenenergy is gained or lost.
- 3- Condensation process is the opposite of..... process.
- 4- To change the gas back into a liquid, you must..... the gas.

Q5: Mention the way of separation of these mixtures:

- 1- Separation of salt from water. (.....)
- 2- Separation of sand from water. (.....)

Q6: Give reasons for:

- 1- Salad is a mixture.
.....
.....
- 2- Evaporation is used to separate salt from water.
.....
.....

Concept 2.3: Describing and measuring matter

Lesson 5

Experiments

What will happen to the mass of the following compounds ?

1- Mixing 10 gm of salt and 10 gm of pepper.



Observation:

- 1- The sum of their masses after mixing equals the sum of their masses before mixing.
- 2- The properties of the substance don't change after mixing.

2- Mixing 10 gm of water and 10 gm of oil.



Observation:

- 1- The sum of their masses after mixing equals the sum of their masses before mixing.
- 2- The properties of the substance don't change after mixing.

Miss: Wesam Jad

123

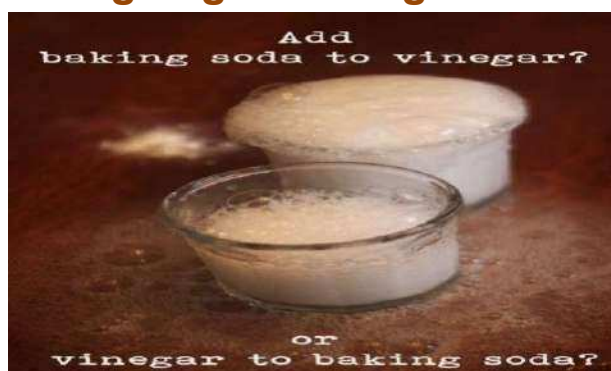
3- Mixing 10 gm of water and 10 gm of salt.



Observation:

- 1- The sum of their masses after mixing equals the sum of their masses before mixing.
- 2- The properties of the substance don't change after mixing.

4- Mixing 10 gm of vinegar and 10 gm of baking soda.



Observation:

- 1- The sum of their masses after mixing equals the sum of their masses before mixing.
- 2- formation of a new compound with new properties and produce bubbles.

vinegar + baking soda $\longrightarrow$ gas bubble.

5- Mixing 10 gm of cornstarch and 10 gm of iodine.



Observation:

- 1- The sum of their masses after mixing equals the sum of their masses before mixing.
- 2- formation of a new compound with new properties.
iodine + cornstarch $\longrightarrow$ dark blue compound.

Conclusion:

a) If two substances don't react.	b) If two substances react (chemical reaction)
Each substance keeps its own identity.	New substance with new properties is formed.
<u>Examples:</u> 1- Water and vinegar. 2- Cornstarch and iodine.	<u>Examples:</u> 1- Vinegar and baking soda. 2- Iodine and starch.

Physical change:

It is a change in the shape, size or even state of the matter without changing its structure.

Examples:

- 1- Cutting cloth to manufacture clothes.
- 2- Cutting vegetables to make salad.
- 3- Melting of wax.
- 4- Shaping of metal and wood.

Chemical change:

It is a change in the matter and its structure, producing new matter.

EXAMPLES:

1- Iron rusting - Iron and oxygen combine to form rust from iron oxide. Rust: Is a flaky, reddish chemical called iron rust. 	2- Burning reaction - Oxygen combines with carbon and hydrogen, they release heat that can start a fire. - The fire can change wood into ash. 
3- Mixing vinegar with baking soda Formation of gas bubbles. 	4- Digestion of food Chemicals inside your body help you digest food. 

Plenty of water, but none to drink

- Many people around the world cannot reach fresh water although the Earth surface contains **70 %** oceans and seas.
- People need fresh water to drink, so they use **desalination process**.

A tricky mixture:

- Seawater and ocean water are a mixture of:
(**water, salt, minerals, gases. Living and dead organisms**).
- The only material that a thirsty person needs is **fresh water**.

Steps of the separation of water from all the other materials:

1st step: Filtration of seawater.	2nd step: Boiling of seawater.
1- Filtering any large materials from water such as, pieces of seaweed, shells, and fish. 2- The water, salts, minerals and gases still pass the filter, so the mixture is still undrinkable.	1- Boil the water to turn into vapor and rises out of the mixture. The salts and other minerals stay behind. 2- You can use a cold surface to trap the water vapor. 3- The water in the beaker is safe to drink. the removal of salt from seawater to get freshwater 

Desalination:

Miss: Wesam Jad

It is the process of removing salts from water.

Notes:

- 1- Drinking salty water makes the human body dehydrate faster as the body lose water faster.
- 2- Egypt has 80 desalination stations.

Disadvantages of desalination:

- 1- It requires a lot of energy.
- 2- It is very expensive.
- 3- Small marine organisms may be sucked up with the water.
- 4- Pumping water that contain big amounts of salts to seawater again is dangerous to marine life.

Classwork questions

Miss: Wesam Jad

128

Q1: Choose the correct answer:

- 1- When three materials are mixed, each of them is 10 g, so the mass of the mixture is.....10 g.
a. equal to b. more than c. less than
- 2-is considered a chemical change of matter.
a. Cutting paper b. Burning paper
c. Melting wax d. Grinding sugar
- 3-is the flaky and reddish color of iron oxide.
a. Ash b. Rust c. Tarnish d. Melted wax
- 4- Mixing baking soda and vinegar produce.....
a. light b. heat c. ash d. gas bubble
- 5-process of seawater removes piece of seaweed, shells and fish.
a. Boiling b. Grinding c. Shaking d. Filtration

Q2: Put (✓) or (X):

- 1- The mass remain constant before and after mixing.()
- 2- Chemical changes are reversed easily. ()
- 3- Cutting off clothes is a physical change. ()
- 4- Frying an egg for your breakfast is a physical change. ()
- 5- Desalination of water occurs in two steps: boiling then filtration. ()
- 6- The only material that a thirsty person needs is salty water. ()

Q4: give reasons for:

Desalination has a great importance.

.....
.....

1. We can remove sea weeds from ocean's water by using process, while we remove salt from ocean's water by
2. In marine food web, algae is considered as , while shark is considered as
3. Measuring cup is used to measure the , while the thermometer is used to measure the

The change in population of one species affects on the population of other species.

Floating and sinking in water depend on mass of the substance. ()

1. The speed of particles of a substance when the temperature increases.
2. The producers and second consumers in an ecosystem, when the number of rabbits increases.

..... is repairing all parts of the habitat, and prevent species from

- a. Population – decrease.
- b. Population – increase.
- c. Habitat restoration – extinction.

1.	Points of comparisons	Evaporation	Condensation
	Motion of particles :		
	Intermolecular spaces :		

2.	Point of comparison	Phloem	Veins
	Function :		

2**Cairo Governorate****Dar Al Salam Educational Zone****1 (A) Choose the correct answer :**

1. A component within a plant that absorbs sunlight during photosynthesis is
a. green chlorophyll. b. stomata. c. seeds. d. xylem.
2. All of the following are considered as producer organisms, except
a. carrot. b. rabbit. c. grass. d. cactus.
3. The phenomenon of coral bleaching happens as a result of water temperature.
a. rising b. moderating c. decreasing d. constant

(B) Give a reason for :

Glass is used to make electric lamps.

2 (A) Put (✓) or (X) :

Photosynthesis occurs in plant seeds. ()

(B) What happens ...?

1. If sunlight does not reach the Earth.

2. When placing a piece of ice in the Sun for a long period of time.

3 (A) Write the scientific term :

Tubes (vessels) carries water from the roots to the leaves. (.....)

(B) Answer the following :

1. Create a food chain from the following organisms.

(Insect – Snake – Grass – Frog)

2. Mention one of the uses of helium.

3**Cairo Governorate****Mokattam Educational Zone****1 (A) Put (✓) or (X) :**

1. Roots absorb sunlight. ()
2. Soil is a basic need for the plant to grow well. ()
3. Heavy rain harms the desert ecosystem. ()

(B) Give a reason for :

Dandelion seeds spread (disperse) by wind.

2 (A) Choose the correct answer :

In photosynthesis, light energy is converted into energy.

- a. gravity b. thermal c. chemical

(B) Write the scientific term :

1. Living organisms that can produce their own food. (.....)
2. The change of matter from the solid state to the liquid state. (.....)

3 (A) Form a food chain from the following organisms :

(Rabbit – Grass – Hawk)

(B) Mention one example of :

1. Decomposers :
2. Gaseous matter :

4

Cairo Governorate

Central Cairo Educational Zone

1 (A) Put (✓) next to the correct statements and (X) next to the incorrect ones :

1. The transport system in plants is like the circulatory system in the human body. ()
2. The rabbit feeds on grass, so it is considered a secondary consumer. ()
3. Loss of habitats is one of the main reasons for the extinction of living organisms. ()

(B) What happens if ... ?

You expose a small amount of water to sunlight for a long period.

2 (A) Choose the correct answer :

The death of marine organisms may occur when they consume

- a. fish. b. plants. c. algae. d. plastic materials.

(B) 1. Create a food chain from the following organisms :

(Carrot – Snake – Bacteria – Rabbit)

2. Mention one state of matter where both its shape and volume are variable.

3 (A) Complete the following sentences :

The process of photosynthesis occurs in

(B) 1. State the scientific reason :

Plants are producer organisms.

Miss: Wesam Jad

2. How can the following mixtures be separated ?

a. A mixture of salt and water.

b. A mixture of sand and water.

5

Cairo Governorate

New Cairo Educational Zone

1 (A) Put (✓) or (X) on the following statements :

1. The stem absorbs water and nutrients from the soil. ()
2. The food chain begins with a producer. ()
3. The number of living organisms decreases if climatic conditions are suitable. ()

(B) What is a measuring tape used for ?

2 (A) Complete the following sentence :

The gas is produced through the process of photosynthesis, and humans use it for breathing.

(B) Write the scientific term :

1. Anything that has mass and occupies space. (.....)
2. A group of food chains interacted with each other. (.....)

3 (A) Choose the correct answer :

The human transportation system is called system.

- a. digestive b. circulatory c. respiratory

(B) Give reasons for :

1. Helium gas is used to fill balloons.

2. The occurrence of coral bleaching.

6

Giza Governorate

6th October Educational Zone

1 (A) Choose the correct answer :

1. The plant makes its food, which is through the process of photosynthesis.

a. protein b. sugar c. seeds

2. The plant absorbs water from the soil through its

a. leaves. b. stem. c. roots.

3. The organisms increase the soil fertility.

a. decomposer b. consumer c. producer

Miss: Wesam Jad

133

(B) Correct the underlined word :

Burning of wood and rusting of iron are physical changes of matter.

(.....)

2 (A) Write what the following statement means :

Vessels that transport blood rich in carbon dioxide gas from the different parts of the body to the heart.

(.....)

(B) Give reasons for :

1. The occurrence of coral bleaching.

.....

2. Cookware handles are made of plastic not metal.

.....

3 (A) Complete the following sentence :

Coconut seeds are transmitted by

(B) What happens if ...?

1. The rain becomes heavy in the desert ecosystem.

.....

2. You put a bottle of water in the freezer.

.....

7

Giza Governorate

Oseem Educational Zone

1 (A) Choose the correct answer :

1. The of a plant absorb water and nutrients from the soil.

a. roots

b. stems

c. leaves

d. flowers

2. All the following are considered producer organisms, except

a. grass.

b. hawks.

c. algae.

d. trees.

3. Microorganisms need water to survive.

a. very hot

b. cold

c. hot

d. warm

(B) Write one example of :

A gaseous matter :

2 (A) Cross out the odd word :

Insects – Trees – Algae – Grasses.

(.....)

(B) What happens ...?

1. If all primary consumers disappear from a certain food chain.

.....

2. To the temperature of a matter if the speed of its particles decreases.

.....

Miss: Wesam Jad

134

3 (A) Correct the underlined word :

Flower of plants produce roots that help the plant to reproduce. (.....)

(B) Give reasons for :

1. Plastic are very harmful to marine organisms.

.....
.....

2. Making fruit salad is considered as a physical change.

.....
.....

8

Giza Governorate

Omrana Educational Zone

1 (A) Choose the correct answer :

1. Grapes tree has stem.

a. runner b. tuber c. climb d. upright

2. Living organisms that feed on the dead bodies are called

a. producers. b. decomposers. c. consumers. d. preys.

3. tubes carry water and minerals from roots to leaves.

a. Phloem b. Xylem c. Arteries d. Veins

(B) Give one example of :

A chemical change :

2 (A) Correct the underlined word :

Any marine food chain starts with a decomposer. (.....)

(B) Give reasons for :

1. Plastic pollution in marine ecosystem is harmful.

.....
.....

2. Ice is a solid matter.

.....
.....

3 (A) What happens when ...?

1. Water of the sea become warm.

.....
.....

2. Increasing temperature of a solid matter.

.....
.....

(B) Cross out the odd word :

Plants – Grasses – Rabbit – Algae. (.....)

.....

Miss: Wesam Jad

135

9

Giza Governorate

Science Inspectorate

1 (A) Correct the underlined words :

1. Veins carry blood rich in oxygen and nutrients. (.....)
2. Coral bleaching means that coral reefs turn completely into green color. (.....)
3. Plants absorb water and nutrients from soil through their leaves. (.....)

(B) Write one example of :

A physical change that occurs to the matter.

2 (A) Choose the correct answer :

All the following from decomposers, except

- a. worms. b. snake. c. bacteria. d. fungi.

(B) Give reasons for :

1. Copper is used in making cooking pans.

2. Burdock seeds can stick to the animal fur.

3 (A) Cross out the odd word :

Clam – Sea urchin – Zooplankton – Algae.

(B) What happens if ... ?

1. A piece of cork is put in water.

2. Plant's leaves don't contain chlorophyll.

10

Alexandria Governorate

El-Montazah Educational Zone

1 (A) Choose the correct answer :

1. The process of photosynthesis occurs in of the plants.

- a. stem. b. flowers. c. leaves. d. roots.

2. The heart consists of chambers.

- a. three b. four c. five d. two

3. We use the unit to measure the mass of the body.

- a. liter b. kilogram c. meter d. centimeter

(B) Give a reason for :

Trees are considered as producers.

Miss: Wesam Jaa

100

2 (A) Put a sign (✓) or (X) :

Blood moves in the arteries or veins in two directions. ()

(B) Write what the following statement means :

1. It contains living organisms and non-living things. (.....)
2. The state of water after freezing. (.....)

3 (A) Complete the following sentences :

1. Sound is considered a form of
2. We use the to measure temperature.

(B) What happens if ...?

The green plant is placed in a dark place for a week.

11

Alexandria Governorate

East Educational Zone

1 (A) Choose the correct answer :

1. Apple and tomato seeds are dispersed by
a. water. b. eaten by animals. c. wind. d. fur.
2. The living organism that can make its own food is called organism.
a. producer b. consumer c. decomposer d. animal
3. The function of plant root is
a. producing food. b. absorbing water. c. reproduction. d. breathing.

(B) Mention one use of :

Measuring cup :

2 (A) Put (✓) or (X) :

Phloem transports water and salts from the plant root to the stem. ()

(B) Give reasons for :

1. Sea turtle eats a lot of plastic materials.
.....
.....

2. Iron has definite volume and does not take the shape of its container.
.....
.....

3 (A) Complete the following :

The microorganisms are considered in the aquatic food chain.

(B) What happens when ...?

1. Putting a piece of wood and a coin in water.
.....

Miss: Wesam Jad

137

2 (A) Put a sign (✓) or (X) :

Blood moves in the arteries or veins in two directions.

()

(B) Write what the following statement means :

1. It contains living organisms and non-living things.

(.....)

2. The state of water after freezing.

(.....)

3 (A) Complete the following sentences :

1. Sound is considered a form of

2. We use the to measure temperature.

(B) What happens if ...?

The green plant is placed in a dark place for a week.

.....

موقع الدكتور محمد رزق التعليمي



امسح الباركود بالمويل لتثبيت
التطبيق وتحميل كل الملازم مجاناً وبسرعه



حمل التطبيق الآن



كورسات ونتائج امتحانات



ملازم ثانوي



ملازم اعدادي



ملازم ابتدائي



موقع الدكتور محمد رزق
Dr. Mo. RIZK



D.M.RAZK

موقع الدكتور محمد رزق معلم الكيمياء التعليمي